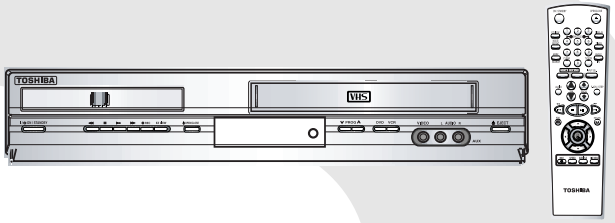
TOSHIBA

FILE NO. 810-200434

SERVICE MANUAL

DVD-VCR COMBINATION

SD-14VBSB
SD-25VESE
SD-25VLSL



Jan., 2005 Ⓢ

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MEMO

1. Precautions

1-1 Safety Precautions

1) Before returning an instrument to the customer, always make a safety check of the entire instrument, including, but not limited to, the following items:

(1) Be sure that no built-in protective devices are defective or have been defeated during servicing. (1)Protective shields are provided to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience.
(2)When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, nonmetallic control knobs, insulating fish papers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning.

(2) Be sure that there are no cabinet openings through which adults or children might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, excessively wide cabinet ventilation slots, and an improperly fitted and/or incorrectly secured cabinet back cover.

(3) Leakage Current Hot Check-With the instrument completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards institute (ANSI) C101.1 Leakage Current for Appliances and Underwriters Laboratories (UL) 1270 (40.7). With the instrument's AC switch first in the ON position and then in the OFF position, measure from a known earth ground (metal water pipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle brackets, metal cabinets, screwheads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis.
Any current measured must not exceed 0.5mA. Reverse the instrument power cord plug in the outlet and repeat the test. See Fig. 1-1.
Any measurements not within the limits specified herein indicate a potential shock hazard that must be eliminated before returning the instrument to the customer.

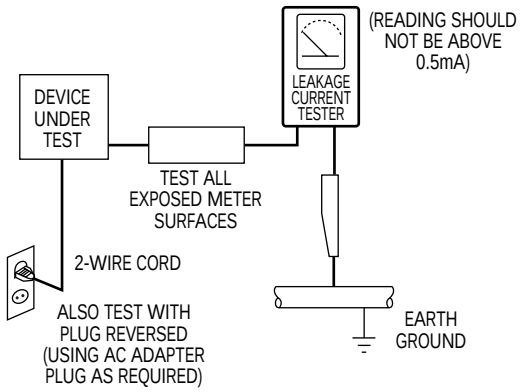

(READING SHOULD NOT BE ABOVE 0.5mA)
LEAKAGE CURRENT TESTER
DEVICE UNDER TEST
TEST ALL EXPOSED METER SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
EARTH GROUND

Fig. 1-1 AC Leakage Test

(4) Insulation Resistance Test Cold Check-(1) Unplug the power supply cord and connect a jumper wire between the two prongs of the plug. (2) Turn on the power switch of the instrument. (3) Measure the resistance with an ohmmeter between the jumpered AC plug and all exposed metallic cabinet parts on the instrument, such as screwheads, antenna, control shafts, handle brackets, etc. When an exposed metallic part has a return path to the chassis, the reading should be between 1 and 5.2 megohm. When there is no return path to the chassis, the reading must be infinite. If the reading is not within the limits specified, there is the possibility of a shock hazard, and the instrument must be repaired and rechecked before it is returned to the customer. See Fig. 1-2.

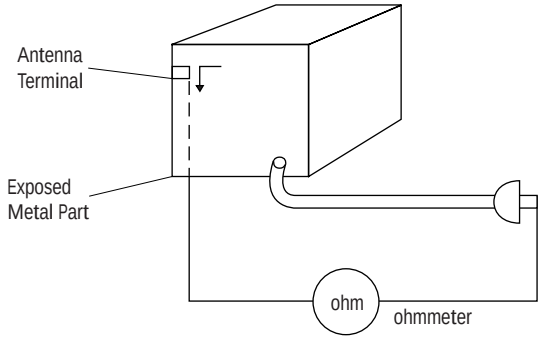


Fig. 1-2 Insulation Resistance Test

2) Read and comply with all caution and safety related notes on or inside the cabinet, or on the chassis.

3) Design Alteration Warning-Do not alter or add to the mechanical or electrical design of this instrument. Design alterations and additions, including but not limited to, circuit modifications and the addition of items such as auxiliary audio output connections, might alter the safety characteristics of this instrument and create a hazard to the user. Any design alterations or additions will make you, the servicer, responsible for personal injury or property damage resulting therefrom.

4) Observe original lead dress. Take extra care to assure correct lead dress in the following areas:
(1) near sharp edges, (2) near thermally hot parts (be sure that leads and components do not touch thermally hot parts), (3) the AC supply, (4) high voltage, and (5) antenna wiring. Always inspect in all areas for pinched, out-of-place, or frayed wiring, Do not change spacing between a component and the printed-circuit board. Check the AC power cord for damage.

5) Components, parts, and/or wiring that appear to have overheated or that are otherwise damaged should be replaced with components, parts and/ or wiring that meet original specifications.
Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.

6) Product Safety Notice-Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by shading, an (⚠)or a (⚠)on schematics and parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire and/or other hazards. Product safety is under review continuously and new instructions are issued whenever appropriate.

1-2 Servicing Precautions

CAUTION : Before servicing units covered by this service manual and its supplements, read and follow the Safety Precautions section of this manual.

Note : If unforseen circumstances create conflict between the following servicing precautions and any of the safety precautions, always follow the safety precautions. Remember: Safety First.

1-2-1 General Servicing Precautions

(1) a. Always unplug the instrument's AC power cord from the AC power source before (1) re-moving or reinstalling any component, circuit board, module or any other instrument assembly, (2) disconnecting any instrument electrical plug or other electrical connection, (3) connecting a test substitute in parallel with an electrolytic capacitor in the instrument.

b. Do not defeat any plug/socket B+ voltage interlocks with which instruments covered by this service manual might be equipped.

c. Do not apply AC power to this instrument and /or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.

d. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

Note : Refer to the Safety Precautions section ground lead last.

(2) The service precautions are indicated or printed on the cabinet, chassis or components. When servicing, follow the printed or indicated service precautions and service materials.

(3) The components used in the unit have a specified flame resistance and dielectric strength.
When replacing components, use components which have the same ratings. Components identified by shading, by(⚠) or by (⚠) in the circuit diagram are important for safety or for the characteristics of the unit. Always replace them with the exact replacement components.

(4) An insulation tube or tape is sometimes used and some components are raised above the printed wiring board for safety. The internal wiring is sometimes clamped to prevent contact with heating components. Install such elements as they were.

(5) After servicing, always check that the removed screws, components, and wiring have been installed correctly and that the portion around the serviced part has not been damaged and so on. Further, check the insulation between the blades of the attachment plug and accessible conductive parts.

1-2-2 Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power ON. Connect the insulation resistance meter (500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts(see note) should be more than 1 Megohm.

Note : Accessible conductive parts include metal panels, input terminals, earphone jacks, etc.

1-3 ESD Precautions

Electrostatically Sensitive Devices (ESD)

Some semiconductor (solid state) devices can be damaged easily by static electricity.
Such components commonly are called Electrostatically Sensitive Devices(ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

(1) Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.

(2) After removing an electrical assembly equipped with ESD devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.

(3) Use only a grounded-tip soldering iron to solder or unsolder ESD devices.

(4) Use only an anti-static solder removal devices. Some solder removal devices not classified as “anti-static” can generate electrical charges sufficient to damage ESD devices.

(5) Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESD devices.

(6) Do not remove a replacement ESD device from its protective package until immediately before your are ready to install it.(Most replacement ESD devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive materials).

(7) Immediately before removing the protective materials from the leads of a replacement ESD device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

CAUTION : Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

(8) Minimize bodily motions when handling unpackaged replacement ESD devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ESD device).

1-4 Handling the optical pick-up

The laser diode in the optical pick up may suffer electrostatic breakdown because of potential static electricity from clothing and your body.

The following method is recommended.

(1) Place a conductive sheet on the work bench (The black sheet used for wrapping repair parts.)

(2) Place the set on the conductive sheet so that the chassis is grounded to the sheet.

(3) Place your hands on the conductive sheet(This gives them the same ground as the sheet.)

(4) Remove the optical pick up block

(5) Perform work on top of the conductive sheet. Be careful not to let your clothes or any other static sources to touch the unit.

- Be sure to put on a wrist strap grounded to the sheet.
- Be sure to lay a conductive sheet made of copper etc. Which is grounded to the table.

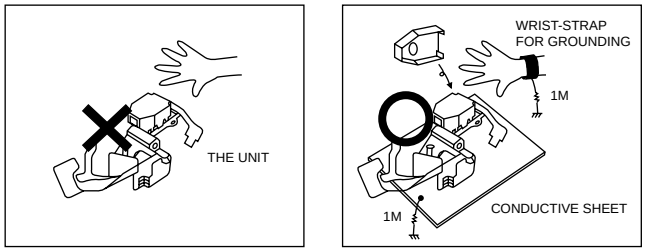


Fig.1-3

(6) Short the short terminal on the PCB, which is inside the Pick-Up ASS'Y, before replacing the Pick-Up. (The short terminal is shorted when the Pick-Up Ass'y is being lifted or moved.)

(7) After replacing the Pick-up, open the short terminal on the PCB.

1-5 Pick-up disassembly and reassembly

1-5-1 Disassembly

1) Remove the power cord.
2) Disassemble the Deck-Assy.
3) Make solder land 2 points short on Pick-up.
   (See Fig. 1-4)
4) Disassemble the Pick-up.

1-5-2 Assembly

1) Replace the Pick-up.
2) Remove the soldering 2 points on Pick-up.
3) Reassemble the Deck-Assy.

Note : If the assembly and disassembly are not done in correct sequence, the Pick-up may be damaged.

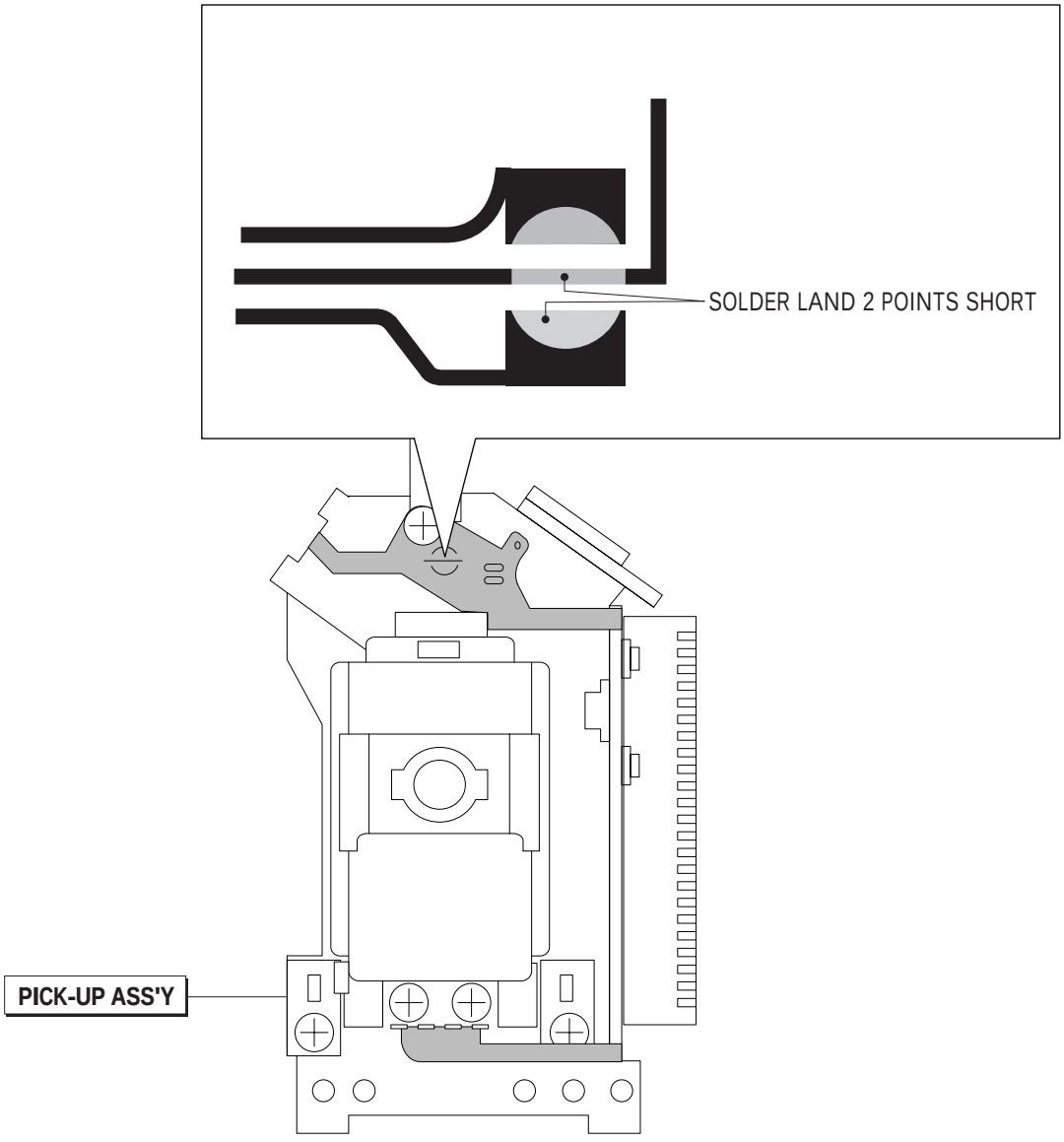


Fig. 1-4

2. Reference Information

2-1 Introduction to DVD

2-1-1 The Definition of DVD

DVD is the next generation medium and is the acronym of the Digital Versatile Disc or the Digital Video Disc, which maximizes the saving density of the disk surface using the MPEG-2 compression technology to enable the storage of 17G bytes of data on the same size CD.

1) 7 times the storage capacity of the conventional CD

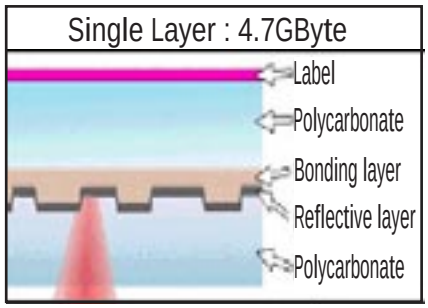
- ◆ Minimized the track pitch and pit size to 1/2 of conventional CD.
- ◆ Uses red laser with short-wavelenght of 650nm (635nm).

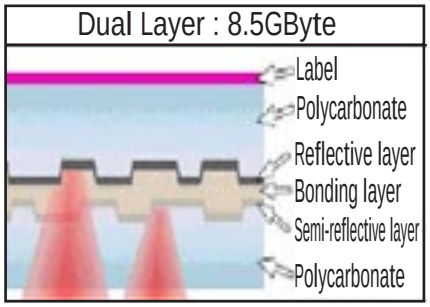
⌘ DVD Vs. CD-ROM

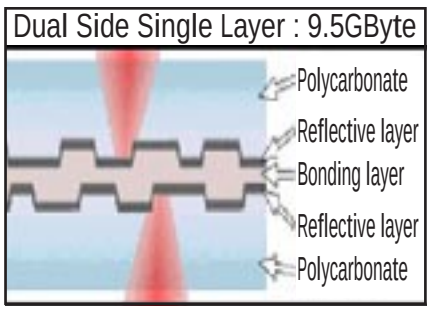
	DVD		CD-ROM
	Single-Layer	Dual-Layer	
Laser Wavelength	650nm (635nm)		780nm
Track Pitch	0.75um		1.6um
Disc Diameter	120mm		
Disc Thickness	1.2 (0.6 x 2) mm		1.2mm
Linear Velocity	3.49m/s	3.84m/s	1.2 ~ 1.4m/s

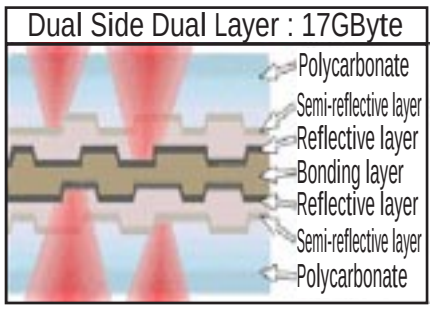
2) Disc Formats

DVD consists of two 0.6mm discs attached together, enabling access to the upper and lower side of the disk, and 4 sides could be used at maximum.









2-1-2 DVD Types

FORMAT	TYPE	APPLICATIONS
DVD-Video	Playback Only	High quality image and sound for movies and other video media.
DVD-ROM	Read Only	Multi-functional, multi-midia software that requires large storage capacity.
DVD-Audio	Playback Only	High quality sound that exceeds the CD, multi-channel Audio.
DVD-R	1 Time Recording	Storage media for the computer.
DVD-RAM	Rewritable	Data access/storage media for the computer.

2-2 DVD-Video Fromat

2-2-1 Main Features

1) Able to store up to 160 minutes of Movie by utilizing the MPEG-2 compression technology. (Aver. 133min.)

2) Enables more than 500 lines of horizontal resolution. (Class corresponding to the Master Tapes used in broadcasting stations)

3) Provides Dolby Digital 5.1ch Surround 3D sound, which enables theater quality sound (NTSC area).
- ◆ For PAL areas, 1 of either MPEG-2 Audio or Dolby Digital must be selected.

4) Multi-Language
- ◆ Able to store up to 8 languages of dubbing.
- ◆ Able to store up to 32 subtitle languages.

5) Milti-Aspect Ratio
3TV Mode alternatives ; 16:9 Wide Screen (DVD Basic) / 4:3 Pan & Scan / Letter Box.

6) Multi-Story
Possible to implement Interactive Viewing which enables the user to select the scenario.

7) Multi-Angle
Able to view the camera angle you selected among the scenes recorded with multiple camera angles.

Note ; The above media features must have the DVD Title that contains the appropriate contents to function properly.

2-2-2 Audio & Video Specifications

<table>
<tr><th colspan="2">Classification</th><th colspan="2">DVD-Video</th><th>Video-CD</th><th>LD</th></tr>
<tr><td rowspan="6">VIDEO</td><td>Compression</td><td colspan="2">MPEG-2</td><td>MPEG-1</td><td rowspan="2">Analog</td></tr>
<tr><td>Pixel</td><td colspan="2">720 x 480</td><td>352 x 240</td></tr>
<tr><td>Horizontal resolution</td><td colspan="2">Max. 500 Lines</td><td>Max. 250 Lines</td><td>Max.420 Lines</td></tr>
<tr><td>Compression rate</td><td colspan="2">1/40</td><td>1/140</td><td rowspan="2">Analog</td></tr>
<tr><td>Transmission speed</td><td colspan="2">Max. 9.8Mbps (variable)</td><td>1.15Mbps (fixed)</td></tr>
<tr><td>TV aspect</td><td colspan="2">16:9 / 4:3</td><td>4:3</td><td>4:3</td></tr>
<tr><td rowspan="5">AUDIO</td><td>Audio</td><td colspan="2">Max. 8 streams</td><td>2CH stereo</td><td rowspan="5">2 Analog CH.
2 Digital CH.
(16Bit/44.1KHz)
or
1 Analog CH.
1 Stream of Dolby Digital
2 Digital CH.
(16Bit/44.1KHz)</td></tr>
<tr><td>Recording type</td><td>Dolby Digital</td><td>Linear PCM</td><td>MPEG-1 Layer 2</td></tr>
<tr><td>Transmission rate</td><td>448Kbps/stream</td><td>6.144Mbps/stream</td><td>224Kbps</td></tr>
<tr><td>Channel</td><td>5.1CH/stream</td><td>8CH/stream</td><td>2CH</td></tr>
<tr><td>Sampling frequency</td><td>48KHz</td><td>16, 20, 24Bit/48, 96KHz</td><td>16Bit/44.1KHz</td></tr>
</table>

2-2-3 Detailed Feature

DVD-Video Feature 1 — **When Developing the DVD Software, various addition and modification is possible.**

As the storage capacity increases, the DVD-Video separates the main data and the additional data such as the Multi-Function into different data areas, enabling the control of time-data ratio to provide the format that enables the flexible Software development

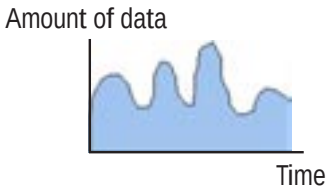
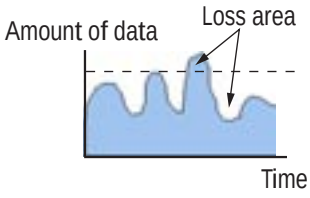
◆ 1 Movie (3.5Mbps)
+ Subtitle (1 Language)
+ Surround Audio (1 Language)
= 160min storage (4.673Gbytes)

◆ 1 Movie (3.5Mbps)
+ Subtitle (4 Language)
+ Surround Audio (4 Language)
= 160min storage (4.680Gbytes)

◆ 1 Music Video (4Mbps)
+ 2ch High quality Audio (96kHz/24bit)
= 72min storage (4.648Gbytes)

DVD-Video Feature 2 — **Application of the MPEG-2 compression technology.**

DVD-Video uses the variable compresion technology, the MPEG-2 to compress the moving image optimally, minimizing the Data loss to Provide a clear, natural screen while increasing the storage time.

DVD-Video	◆ MPEG-2 (Variable compression : Max. 1/40) ✓ Field unit compression. ✓ Compression rate change according to the amount of Data. ✓ Differentiates the still image anf the moving image compression rete, reducing Data loss and enables efficient compression.	
Video-CD	◆ MPEG-1 (Fixed compression : Max. 1/140) ✓ Frame unit compression. ✓ Compresses all data using the same ratio. - Fast movements are jagged, and unnatural	

DVD-Video Feature 3 | **High quality surround audio.**

DVD-Video can store the audio using the 5.1ch Dolby Digital compression or the advanced Liner PCM method, providing the better-than-CD quality and theater like audio quality.

◆ Dolby Digital (AC-3)
- ✓ Unlike the traditional Dolby pro-Logic method, the Dolby Digital method separates all 5 main channels (Front L/R, Center, Surround (Rear) L/R)and the Sub woofer to provide live surround audio.
- ✓ Using the Down Mix method, the conventional Dolby Pro-Logic and Stereo are all compatible.
- ✓ Each separated channels are played back at CD quality sound. (Frequency band: 20Hz ~ 20KHz)

◆ Linear PCM (Pulse Code Modulation)
- ✓ Provides the high quality Digital sound without the audio data compression.
- ✓ Various Digital Recordings are possible as shown in the table to the right.

Sampling Frequency	Bit Rate
48KHz	16bit
	20bit
	24bit
96KHz	16bit
	20bit
	24bit

◆ Dolby Digital compatible Audio Mode

Audio Coding Mode	Channel Format					Remark
	Front			Surround (Rear)		
	L	C	R	L	R	
1/0		O				Mono
2/0	O		O			Stereo
3/0	O	O	O			Surround
2/1	O		O	Mono		
3/1	O	O	O	Mono		
2/2	O		O	O	O	
3/2	O	O	O	O	O	

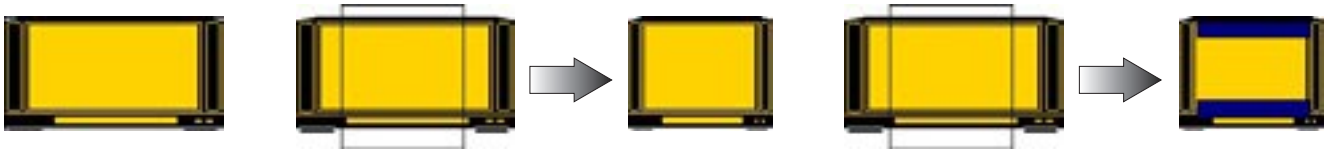
DVD-Video Feature 4 — Multi-Language

- Audio Dubbing - Max. 8 Languages
- Subtitle - Max. 32 Languages. Capable of storing, and selectiong.
- Linear PCM (Pulse Code Modulation)

DVD-Video Feature 5 — Multi-Aspect

- Unlike the conventional VCD or LD, DVD-Video has the default of 16:9 Wide, and can be viewed using the conventional 4:3 TV, enabling the expansion of viewer selection capabilities.

  ✓ 16 : 9 TV : Wide Mode (16:9 Wide Full Screen)
  ✓ 4 : 3 TV : Letter Box Mode, Pan & Scan Mode

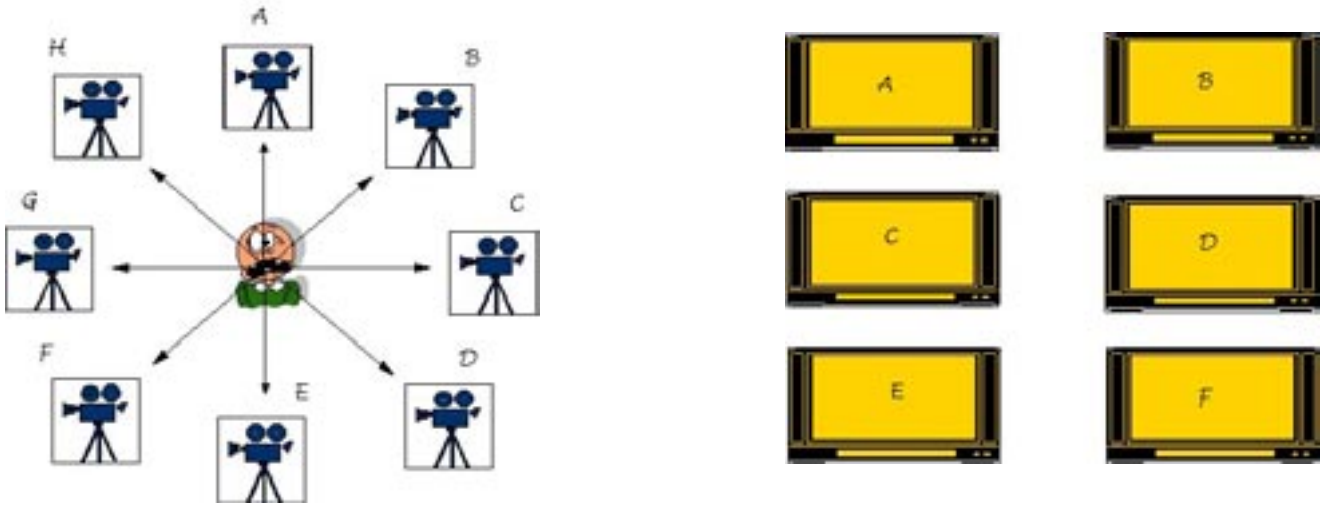


16:9 Wide 4:3 Pan & Scan 4:3 Letter Box

Note ; Only enable to be worked correctly by an appropriate data supported this function in Disc.

DVD-Video Feature 6 — Multi-Angle

- Up to 9 angles of view may be stored, enabling the viewer to select a specific viewpoint at a given time.
  --> Especially, for the Music Video and Sports Title, this provides a more lively image of the scene.



Note ; Only enable to be worked correctly by an appropriate data supported this function in Disc.

DVD-Video Feature 7 | **Multi-Story**

◆ DVD-Video provides the enviroment suitable for the bi-directional Software develoment, providing multiple scenarios. This feature enables the Multi-Story function.

OPTION | **Parental Lock**

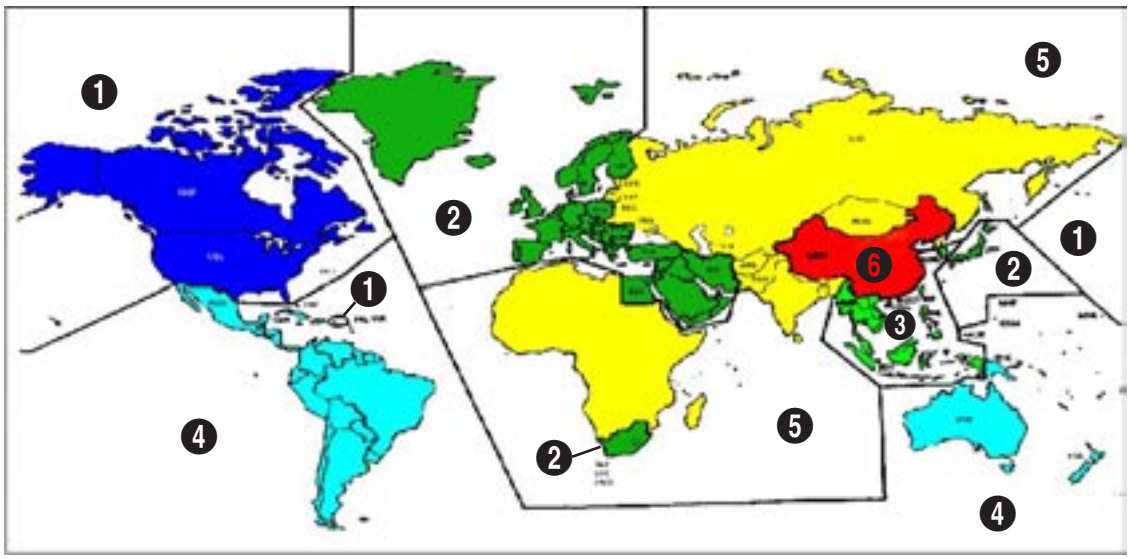
◆ For the titles that are not suitable for children viewing, Parental Locks are set, requesting user defined passwords for viewing
◆ Parential Locks may be set on specific frames of the Title, enabling the player to skip those frames during playback.

COPYRIGHT | **Regional Code & Macrovision**

◆ Classify the world into 6 regions, and if the DVD Title and the Player's "Reginal Code" do not agree, playback is prohibited.

⌘ **Regionnal Coding is optional for the Soft developers (Region 0 All Code), but the Hardware developers must adopt the appropriate regionnal code for sale.**

✓ Region 1 : The United States and its territories, Canada.
✓ Region 2 : Europe, Japan, Greenland, Egypt, South Africa, the Middle East.
✓ Region 3 : Taiwan, Hongkong, Korea, South East Asia.
✓ Region 4 : Mexico, South America, Australia, New Zealand.
✓ Region 5 : Russia, Eastern Europe, India, Africa.
✓ Region 6 : China.
✓ Region 0 : Worldwide (All Code)



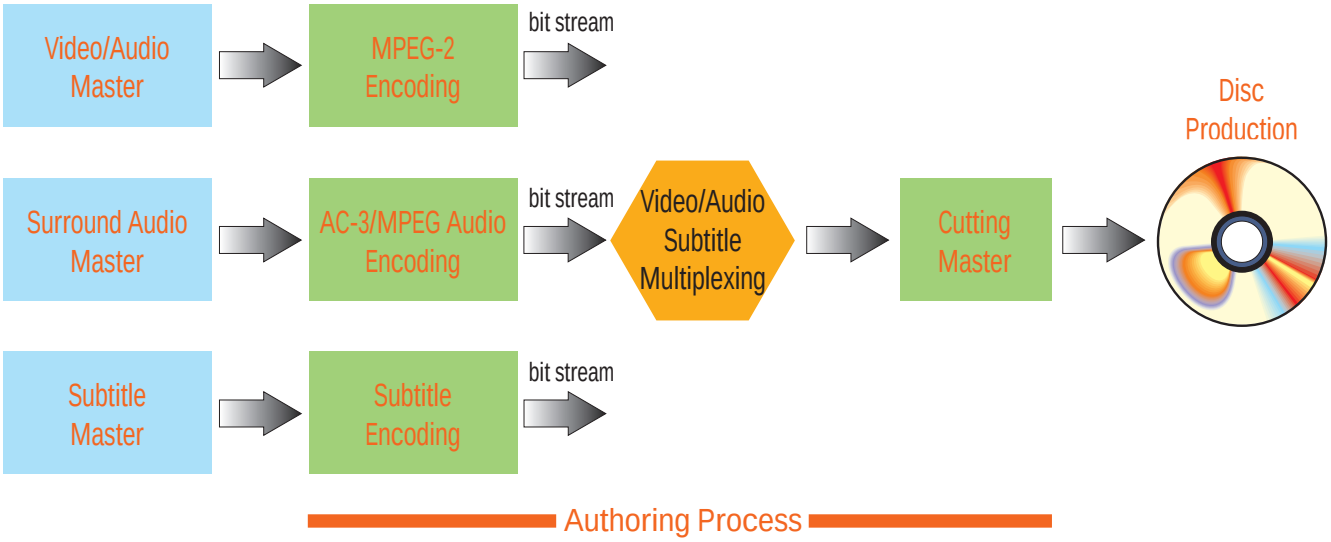
◆ Adoptation of the Macrovision System disables the copying on to other media.

Remark | **DVD-Video Authoring Process**

◆ The image quality of the DVD-Video may vary accoring to the quality of the Master and the Authoring Process

✓ The image quality of the DVD-Video varies according to the Digital Mastering Source such as the conventional LD, VCD, or Original Film.
✓ Different Authoring Process are used accoring to the Software developers, and this may affect the DVD image quality.

⌘ Authoring Process

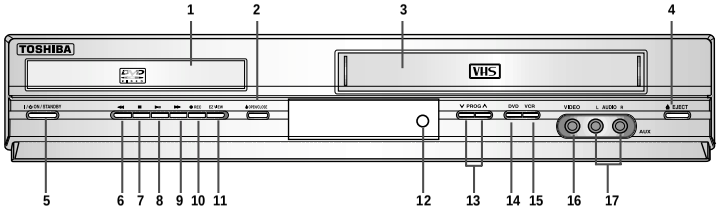


3. Product Specification

General	Rated Voltage	220 - 240V, 50Hz
	Power Consumption	19 Watts
	Weight	3.9Kg
	Size	430mm x 282mm x 82mm
	Operating ambient Temperature	+5°C ~ +35°C
	Installation Conditions	Operation position : Horizontal, Relative humidity : Below 75%
Input	Video input (Rear)	Euro Scart socket : 1.0Vp-p (unbalanced) 75ohm
	Audio input (Rear)	Euro Scart socket : -8dBm, 47Kohm unbalnced
Output	RF out	UHF 21-69 (Initial CH36)
	Audio (DVD, VCR)	RCA jack, Euro Scart socket
	Audio (DVD only)	Digital audio out COAXIAL, RCA jack
	Video (DVD, VCR)	RCA jack, Euro Scart socket
	Video (DVD only)	S-Video out, RGB out : Euro Scart socket
VCR	Tape format	VHS type video tape
	Color system	PAL, NTSC4.43, NTSC playback on PAL TV
	Video S/N	Above 43dB (standard recording)
	Resolution	Above 240 lines (standard recording)
	Audio S/N	Above 68dB (Hi-Fi), 39dB (Mono)
	Audio frequency characteristics	20Hz - 20KHz (Hi-Fi)
DVD	Disc	DVD, CD (12Cm), CD (8Cm), VCD
	Audio S/N	95dB
	Audio dynamic range	105dB

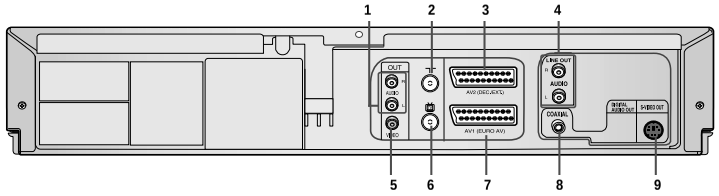
MEMO

Front View of the DVD-VCR



1 DVD DECK
2 OPEN/CLOSE BUTTON
3 VIDEO CASSETE COMPARTMENT
4 EJECT BUTTON
5 ON/STANDBY BUTTON
6 REW/SKIP BACK BUTTON
7 STOP BUTTON
8 PLAY/STILL BUTTON
9 F.F / SKIP NEXT BUTTON
10 RECORD BUTTON
11 EZ VIEW BUTTON
12 REMOTE CONTROL SENSOR
13 PROGRAME SELECTION BUTTON
14 DVD SELECT BUTTON
15 VCR SELECT BUTTON
16 AUX VIDEO INPUT JACK
17 AUX AUDIO L, R INPUT JACKS

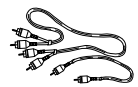
Rear View of the DVD-VCR



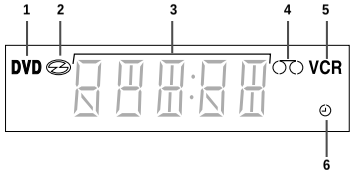
1 AUDIO OUT JACKS
2 AERIAL IN CONNECTOR
3 AV2 (DEC./EXT.) SCART (EURO-21) SOCKET
4 AUDIO L, R OUT JACKS (DVD Only)
5 VIDEO OUT JACK
6 OUT TO TV CONNECTOR
7 AV1 (EURO AV) IN/OUT SCART (EURO-21) SOCKET
8 DIGITAL COAXIAL AUDIO OUT JACK (DVD Only)
9 S-VIDEO OUT JACK (DVD Only)

Accessories

You have just purchased a TOSHIBA DVD Video Player & Video Cassette Recorder (DVD-VCR). Together with your DVD-VCR, you will find the following accessories in the box.

REMOTE CONTROL & BATTERIES	AUDIO & VIDEO CABLE	OWNER'S INSTRUCTIONS	COAXIAL CABLE
			

Display Indicators



1 The DVD Deck is active
2 A DVD, CD or VCD is loaded
3 The time, counter position, time remaining or current deck status is displayed
4 VHS tape is inserted
5 The VCR Deck is active
6 A Timer Recording is programmed or in progress.

Inserting Batteries in the Remote Control

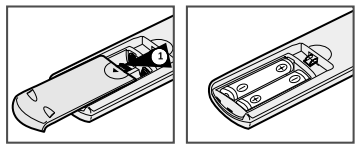
You must insert or replace the batteries in the remote control when you:

- *Purchase the DVD-VCR*
- *Find that the remote control is no longer working correctly*

1 Push the tab in the direction of the arrow to release the battery compartment cover on the rear of the remote control.

2 Insert two AA, R6 or equivalent batteries, taking care to respect the polarities:
- \+ on the battery with + on the remote control
- – on the battery with – on the remote control

3 Replace the cover by aligning it with the base of the remote control and pushing it back into place.



➢ *Do not mix different battery types (manganese and alkaline for example).*

Connecting DVD-VCR to the TV using the Coaxial Cable

To receive television programmes a signal must be received from one of the following sources:

- *An outdoor aerial*
- *An indoor aerial*
- *A cable television network*
- *A satellite receiver*

☛ *Make sure that both the television and the DVD-VCR are switched off before connecting the cables.*

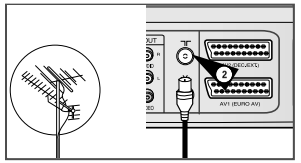
1 Remove the aerial or network input cable from the television.

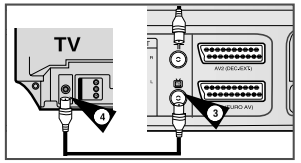
2 Connect this cable to the 75Ω coaxial socket marked ⊣⊢ on the rear of your DVD-VCR.

3 Plug the coaxial cable supplied into the TV socket on your DVD-VCR.

4 Plug the other end of the coaxial cable into the connector previously used for the aerial on the television.

5 To obtain better quality pictures and sound on your television, you can also connect your DVD-VCR to the television via the SCART cable (see page 8) if your television is equipped with this type of connection.





Connecting DVD-VCR to the TV using the SCART Cable

You can connect your DVD-VCR to the television using the SCART cable if the appropriate input is available on the television. You thus:

- *Obtain better quality sound and pictures*
- *Simplify the setting up procedure of your DVD-VCR*

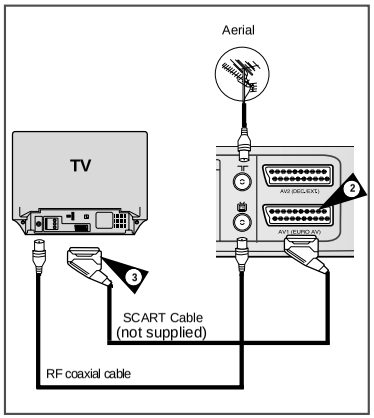
☛ *Regardless of the type of connection chosen, you must always connect the coaxial cable supplied. Otherwise, no picture will be visible on the screen when the DVD-VCR is switched off.*

☛ *Make sure that both the television and the DVD-VCR are switched off before connecting the cables.*

1 Connect the coaxial cable as indicated in page 7.

2 Connect one end of the SCART cable (not supplied) to the AV1 (EURO AV) socket on the rear of the DVD-VCR.

3 Plug the other end into the appropriate connector on the television.



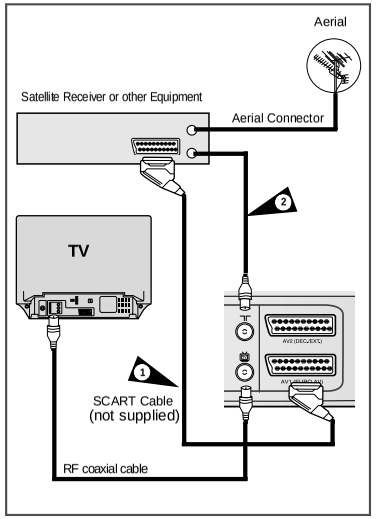
Connecting DVD-VCR to a Satellite Receiver or Other Equipment

You can connect your DVD-VCR to a Satellite receiver or other DVD-VCR using the SCART cable if the appropriate outputs are available on the equipment chosen. The following illustrations give a few examples of the connection possibilities.

◆ AV1 Connection

1 **AV1(EURO AV): By means of 21-pin Scart Cable**
Plug the SCART Cable with satellite receiver or other equipment into the AV1 (EURO AV) socket on the rear of the DVD-VCR.
After making this connection, select the source by pressing the INPUT SEL. button for the AV1 input sources.

2 **By means of RF Coaxial Cable**
After making this connection, you must preset the station received through the satellite tuner.
RF output channel of the satellite receiver should be adjusted away from channel 60, which is used by the DVD-VCR, e.g. re-adjust to channel 65.

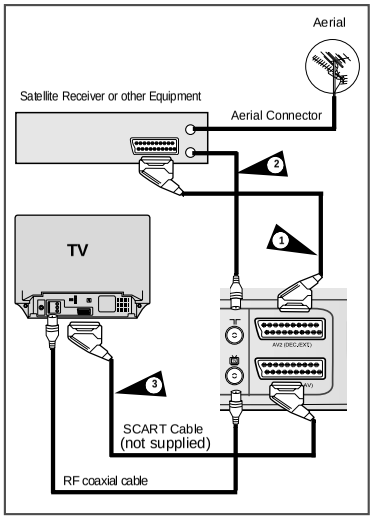


◆ AV2 Connection

1 **AV2 IN: By means of 21-pin Scart Cable**
Plug the SCART Cable (not supplied) with satellite receiver or other equipment into the AV2 (DEC./EXT.) socket on the rear of the DVD-VCR.
After making this connection, select the source by pressing the INPUT SEL. button for the AV2 input sources.

2 **By means of RF Coaxial Cable**
After making this connection, you must preset the station received through the satellite tuner.
RF output channel of the satellite receiver should be adjusted away from channel 60, which is used by the DVD-VCR, e.g. re-adjust to channel 65.

3 **By means of Scart Cable**
To obtain better quality pictures and sound on your television, you can also connect your DVD-VCR to the television via the SCART AV1(EURO AV) if your television is equipped with scart input. But the television must be set to audio/video mode(AV).



Connecting the Audio Output Cable

You can connect your DVD-VCR to a Hi-Fi system.

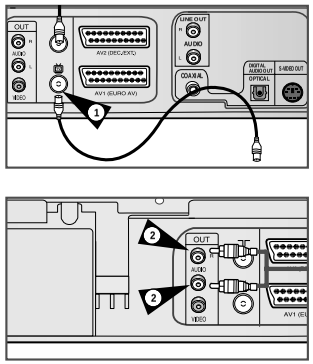
Example : You wish to take advantage of the quality of your Hi-Fi stereo system when watching a programme or recording via your DVD-VCR.

☛
- Regardless of the type of connection chosen, you must always connect the coaxial cable supplied. Otherwise, no picture will be visible on the screen when the DVD-VCR is switched off.
- Make sure that both the television and the DVD-VCR are switched off before connecting the cables.

1 Connect the coaxial cable or SCART as indicated on page 7 and 8.

2 Plug the audio output cable into the audio connectors on the rear of your DVD-VCR.

3 Plug the other end of the audio cable into the appropriate input connectors on your Hi-Fi stereo system.



Plug & Auto Set up

Your DVD-VCR will automatically set itself up when it is plugged into the mains for the first time. TV stations will be stored in memory. The process takes a few minutes. Your DVD-VCR will then be ready for use.

1 Connect the coaxial cable as indicated on page 7. (Connecting Your DVD-VCR to the TV Using the Coaxial Cable)

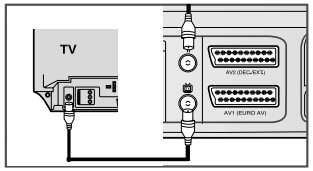
2 Plug the DVD-VCR into the mains.

3 Start the auto scanning.
- ◆ The number of stations automatically stored by the DVD-VCR depends on the number of stations that it has found.

4 The current time and date are displayed automatically.
Check the date and time.
if it is :
- ◆ Incorrect, see page 11.
- ◆ Correct, Press RETURN button twice to exit the menu.

➢ Now, you only have to switch the DVD-VCR on and it is ready for use.

☛ Function for "Plug & Auto Set Up" is fixed already. So if you want to change this fixed one, you can change it by Presetting the Stations Automatically in OSD " Auto Setup" menu. (see page 12)



Tuning Your Television for the DVD-VCR

It is only necessary to tune your DVD-VCR if you are not using a SCART.

➢ ***To view pictures from your DVD-VCR when a Scart cable is used, the television must be set to the audio/video mode (AV).***

1 Switch on the television.

2 Switch on the DVD-VCR by pressing ON/STANDBY on the front of the DVD-VCR or ON/STANDBY on the remote control.

3 Select a programme position on the television to be reserved for use with your DVD-VCR.

4 Insert the video cassette in the DVD-VCR. Check that the DVD-VCR starts reading the cassette; if not, press ►II button.

5 Start a scan on your television or set the television to UHF channel 60.

6 Fine tune the television until the pictures and sound are obtained clearly.

7 If you cannot find the pictures and sound, or there is interference from nearby channels, it may be necessary to change the setting of the DVD-VCR output channel (see Setting the DVD-VCR Output Channel on page 15 and Problems and Solutions on page 41).

8 When the picture and sound are perfectly clear, store this channel at the desired programme position on the television.
Result: That programme is now reserved for use with your DVD-VCR.

Seleting the Viewing Source

You must select one of your output sources (DVD or VCR) to view on the TV screen

- If you want to view DVD deck output source: Press DVD until DVD indicator in the display window lights and output source of DVD deck is viewed on the TV screen.
- If you want to view VCR deck output source: Press VCR until VCR indicator in the display window lights and output source of VCR deck is viewed on the TV screen.

Setting the Date and Time

Your DVD-VCR contains a 24-hour clock and calendar used to:
- ◆ ***Automatically stop programme recording***
- ◆ ***Preset your DVD-VCR to record a programme automatically***

You must set the date and time when:
- ◆ ***You purchase the DVD-VCR***

☛
- ◆ The time and date are set automatically from the broadcast signal. If the signal is weak or ghosting occurs, the time and date may not be set automatically. In this case, they should be set manually.
- ◆ Do not forget to reset the time when you change clocks from winter to summer time and vice versa.

1 After pressing the MENU, press the OK or ▶.
Result: The Setup menu is displayed.

2 Press the corresponding ▲, ▼ buttons to select the **Clock** option.

3 Press the OK or ▶ to select this option.
Result: The **Clock Set** menu is displayed.

4 Press ◀, ▶ to select the hour, minutes, day, month and year.
Result: The option selected will be highlighted.

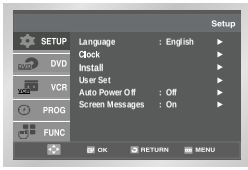
5 Press the ▲,▼ buttons to increase or decrease the value.
Result: The day of the week is displayed automatically.

➢ You can hold the ▲,▼ buttons down to scroll more quickly through the values.

6 On completion, press RETURN to go back to the previous menu or press MENU to exit the setup menu.

Setting the Menu Language

1 **Open MENU**
After pressing the MENU, press the OK or ▶.



2 **Select Language**
Use the ▲, ▼ buttons to highlight **Language**, then press the OK or ▶.

3 Press the ▲, ▼ buttons to select your desired language, then press the OK button.

4 On completion, press RETURN to go back to the previous menu or press MENU to exit the setup menu.

Presetting the Stations Automatically

☛ *You do not need to preset the stations if you have already set them automatically (see Plug & Auto Set Up on page 10).*

Your DVD-VCR contains a built-in tuner used to receive television broadcasts.

You must preset the stations received through the tuner. This can be done:

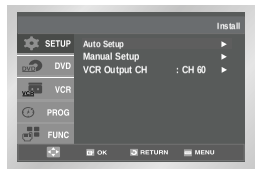
- ***Plug & Auto Set up (see page 10)***
- ***Automatically***
- ***Manually (see page 13)***

You can store up to 80 stations.

1 After pressing the MENU, press the OK or ▶.
Result: The Setup menu is displayed.

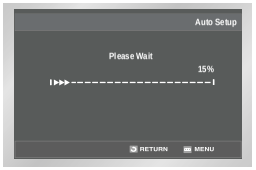
2 Press the corresponding ▲, ▼ buttons to select the **Install** option.

3 Press the OK or ▶ to select this option.
Result: The **Install** menu is displayed.



4 Press the corresponding ▲, ▼ buttons, until the **Auto Setup** is selected.
And then press the OK or ▶ to select this option.
Result: A message appears, indicating that any channels already preset on your DVD-VCR will be deleted.

5 Press OK to start the auto scanning.



Result:
- The **Please Wait** indication highlight on the television screen.
- The first frequency band is scanned and the first station found will be stored.
- The DVD-VCR then searches for the second station and so on.
- When the automatic scanning procedure has finished, the DVD-VCR switches automatically to programme 1.

➢ The number of stations automatically stored by the DVD-VCR depends on the number of stations that it has found.

6 If you wish to cancel the auto scanning before the end, press the MENU button to exit the menu.

➢
- ***The time and date are set automatically from the broadcast signal. If the signal is weak or ghosting occurs, the time and date may not be set automatically. In this case, they should be set manually (see page 11).***
- ***Once the auto scanning procedure has finished, some stations may have been stored more than once; select the stations with the best reception and delete the ones no longer required (see page 14).***

Presetting the Stations Manually

☛ *You do not need to preset the stations manually if you have already set them automatically.*

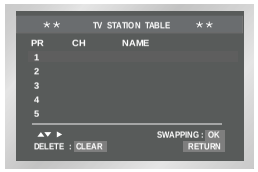
1 After pressing the MENU, press the OK or ▶.
Result: The Setup menu is displayed.

2 Press the corresponding ▲, ▼ buttons to select the **Install** option.

3 Press the OK or ▶ to select this option.
Result: The **Install** menu is displayed.

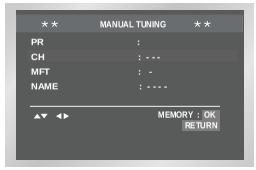
4 Press the corresponding ▲, ▼ buttons, until the **Manual Setup** option is selected.

5 Press the OK or ▶ to select a **Manual Setup** option.
Result: The **TV STATION TABLE** menu is displayed.



6 Press the ▲, ▼ buttons to select a programme number as required.

7 Press the ▶ button to preset the station.
Result: The **MANUAL TUNING** menu is displayed.



8 Press the ◀ or ▶ button to start scanning the channels.
Result: The frequency band is scanned and the first station found is displayed.

9 Press the ▲, ▼ buttons until the **NAME** is selected. The station name is set automatically from the broadcast signal.

10 To change the programme's name, press the ▶ button.
Result: The first letter of the name flashes.

11

To...	Then...
Select a character in the name	Press the ▲, ▼ buttons until the required character is displayed (letters, numbers or "-" character).
Move to the next or previous character	Press the ◀ or ▶ buttons respectively.

12

If you...	Then...
Wish to store the station displayed	◆ Press the ▲, ▼ buttons until the **MFT** is selected. ◆ Press the ◀, ▶ buttons to adjust the picture, if necessary. ◆ Press OK to store the station
Do not wish to store the station displayed	◆ Press the ▲, ▼ buttons until the **CH** is selected. ◆ Press the ◀, ▶ buttons to go on scanning the frequency band and display the next station ◆ Go back to the beginning of Step **12**

13 Repeat this procedure from Step **6** onwards, until all the required stations have been stored.

14 On completion, press RETURN to go back to the previous menu or press MENU to exit the setup menu.

Clearing a Preset Station

☛ *If you have stored a TV station:*

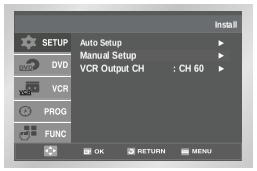
- *That you do not require*
- *At the wrong programme position*

you can cancel it.

1 After pressing the MENU, press the OK or ▶.
Result: The Setup menu is displayed.

2 Press the corresponding ▲,▼ buttons to select the **Install** option.

3 Press the OK or ▶ to select this option.
Result: The **Install** menu is displayed.



4 Press the corresponding ▲,▼ buttons, until the **Manual Setup** option is selected.

5 Press the OK or ▶ to select a **Manual Setup** option.
Result: The **TV STATION TABLE** menu is displayed.

6 Press the corresponding ▲,▼buttons, until the required preset TV station (PR) is selected.

7 Press the CLEAR button.

8 Repeat the same procedure from Step 6 onwards until all the required stations have been cleared.

9 On completion, press RETURN to go back to previous menu or press MENU to exit the setup menu.

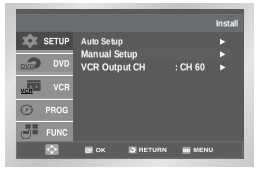
Changing the Preset Station Table

You can rearrange the Station Table and give different programme numbers to the stations listed according to your own preferences.

1 After pressing the MENU, press the OK or ▶.
Result: The Setup menu is displayed.

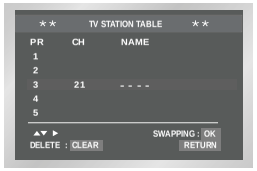
2 Press the corresponding ▲,▼ buttons to select the **Install** option.

3 Press the OK or ▶ buttons to select this option.
Result: The **Install** menu is displayed.



4 Press the corresponding ▲,▼ buttons, until the **Manual Setup** option is selected.

5 Press the OK or ▶ button to select this option.
Result: The **TV STATION TABLE** menu is displayed.



6 Press the corresponding ▲,▼ buttons, until the required preset TV programme is selected.
Result: The selected station is displayed at the same time on the television screen.

7 To change the programme number assigned to a station press the OK button on the remote control. (For example, To move a TV station in programme 1 to programme 3)

8 Press the ▲,▼ buttons to select required position. And then press OK again to swap the position.

9 On completion, press RETURN to go back to previous menu or press MENU to exit the setup menu.

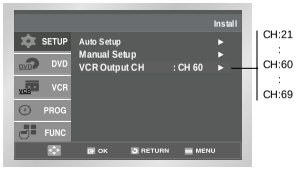
Setting the DVD-VCR Output Channel

Your DVD-VCR output channel may need to be changed if the pictures suffer from interference or if your TV cannot find the pictures.
Also, you can change the DVD-VCR output channel to adjust the frequency in which information is displayed on the screen.

1 After pressing the MENU, press the OK or ▶.
Result: The Setup menu is displayed.

2 Press the corresponding ▲, ▼ buttons to select the **Install** option.

3 Press the OK or ▶ to select this option.
Result: The **Install** menu is displayed.



4 Press the ▲, ▼ buttons, until the **VCR Output CH** option is selected.

5 Select the required output channel (CH21~CH69) by pressing the OK or ▶ button.

CH21 → .. CH60 → .. CH69

6 On completion, press RETURN to go back to previous menu or press MENU to exit the setup menu.
Then tune your television again (see page 10).

Selecting the Colour Mode

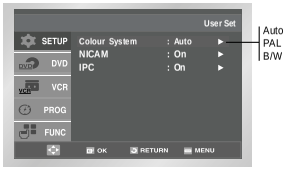
Before recording or playing back a cassette, you can select the required system standard.
Otherwise, the system automatically selects the reception standard when you select AUTO.

➢
- ***When playing back a cassette, the standard is automatically selected by the DVD-VCR.***
- ***When you playback an NTSC-recorded tape on this DVD-VCR make a setting on the colour system according to your TV. If your TV is a PAL system only TV, set NTPB.***
  If your TV is Multi System TV (NTSC 4.43 compatible), set NT4.43 and you can record NT4.43.

1 After pressing the MENU, press the OK or ▶.
Result: The Setup menu is displayed.

2 Press the corresponding ▲, ▼ buttons to select the **User Set** option.

3 Press the OK or ▶ to select this option.
Result: The **User Set** menu is displayed.



4 Press the corresponding ▲, ▼ buttons, until the **Colour System** option is selected.

5 Press the OK or ▶ button to select **Auto → PAL→ B/W.**

Auto	When playing back a cassette, the system standard is automatically selected by the DVD-VCR.
B/W	Black and White

6 On completion, press RETURN to go back to previous menu or press MENU to exit the setup menu.

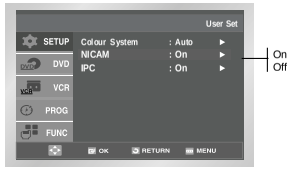
NICAM

NICAM programmes are divided into 3 types. NICAM Stereo, NICAM Mono and Bilingual (transmission in another language).
NICAM programmes are always accompanied by a standard mono sound broadcast and you can select the desired sound. Please refer to page 21.

1 After pressing the MENU, press the OK or ▶.
Result: The Setup menu is displayed.

2 Press the corresponding ▲, ▼ buttons to select the **User Set** option.

3 Press the OK or ▶ to select this option.
Result: The **User Set** menu is displayed.



4 Press the corresponding ▲, ▼ buttons, until the **NICAM** option is selected.

5

To...	Press OK or ▶, until...
Mono mode	**Off** is displayed. Off: Only set at this position to record the standard mono sound during a NICAM broadcast if the stereo sound is distorted due to inferior reception conditions.
NICAM mode	**On** is displayed. On: Normally set at this position.

6 On completion, press RETURN to go back to previous menu or press MENU to exit the setup menu.

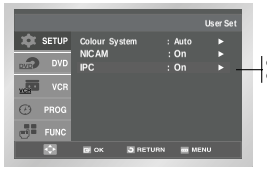
Intelligent Picture Control

The Intelligent Picture Control Feature allows you to adjust the sharpness of the image automatically, according to your own preferences.

1 During playback, press the MENU button on the remote control, then press the OK or ▶.
Result: The Setup menu is displayed.

2 Press the corresponding ▲, ▼ buttons to select the **User Set** option.

3 Press the OK or ▶ button to select this option.
Result: The **User Set** menu is displayed.



4 Press the corresponding ▲, ▼ buttons, until the **IPC** option is selected.

5 Press the OK or ▶ buttons to select the IPC (intelligent picture control) option.
➢ When intelligent picture control mode is **ON**, the sharpness of the image is adjusted automatically.

6 To adjust the sharpness manually, press the ▼ button to turn the IPC mode **OFF**.

7 Press the ◀ , ▶ buttons until the picture is displayed according to your preferences.
➢ If you do not press a button within ten seconds, the **PICTURE** menu disappears automatically.

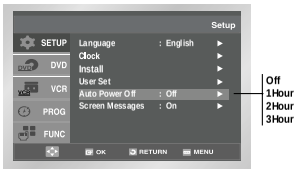
8 On completion, press the RETURN button to exit the menu.

Auto Power off

The Auto Power Off feature automatically turns off your DVD-VCR if no signal is received and you do not press any button for the selected time.

1 After pressing the MENU, press the OK or ▶.
Result: The Setup menu is displayed.

2 Press the corresponding ▲, ▼ buttons, until the **Auto Power Off** option is selected.



3 Press the OK or ▶ button until you select the time of Auto Power Off interval.

Off → 1Hour → 2Hour → 3Hour

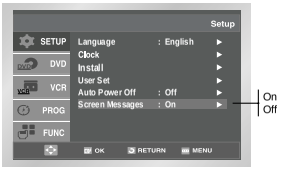
4 On completion, press RETURN to go back to previous menu or press MENU to exit the setup menu.

Screen Messages

Your DVD-VCR displays most information both on the DVD-VCR and the television.
You can choose to display or hide this information on the television screen (except for the SEARCH, Programming MENU and Timer functions, which cannot be hidden).

1 After pressing the MENU, press the OK or ▶.
Result: The Setup menu is displayed.

2 Press the corresponding ▲, ▼ buttons, until the **Screen Messages** option is selected.



3

To...	Press OK or ▶, until...
Display on-screen information	**On** is displayed.
Hide on-screen information	**Off** is displayed.

4 On completion, press RETURN to go back to previous menu or press MENU to exit the setup menu.

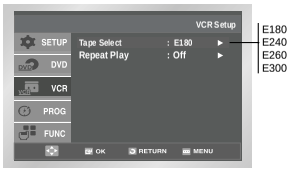
Selecting the Cassette Type

If you wish to use the tape counter to display the time remaining on a cassette, you must indicate the type of cassette inserted.

1 After pressing the MENU, press the corresponding ▲, ▼ buttons to select the **VCR** option.

2 Press the OK or ▶ buttons to select this option.
Result: The **VCR Setup** menu is displayed.

3 Press the corresponding ▲, ▼ buttons, until the **Tape Select** option is selected.



4 Press the OK or ▶ buttons as many times as required, until the correct cassette length is displayed.

E180 → E240
E 300 ← E260

5 Press RETURN to go back to previous menu or press MENU to exit the setup menu.

Repeat Play

You can set repeat play to repeat the tape continuously from beginning to end.

To...	Press OK or ▶, until...
Repeat play	**On** is displayed.
Do not wish to repeat play	**Off** is displayed.

Selecting the Recording Speed

You can record a cassette at two different speeds:

- *SP (Standard Play)*
- *LP (Long Play)*

In Long Play modes:

- *Each cassette lasts twice as long*
- *The recording is of a slightly lower quality*

To record a cassette...	Press the SPEED button on the remote control, until...
In standard play mode	**SP** is displayed.
In long play mode	**LP** is displayed.

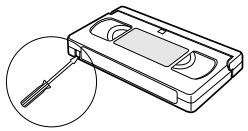
Type	Recording Time (in SP)
E-180	180 mins. or 3 hours
E-240	240 mins. or 4 hours
E-260	260 mins. or 4 hours and 20 mins.
E-300	300 mins. or 5 hours

Protecting a Recorded Cassette

Video cassettes have a safety tab to prevent accidental erasure. When this tab has been removed, you cannot record on the tape.

1 If you wish to protect a cassette, break off the tab using a small screwdriver.

2 To re-record over a protected cassette (safety tab broken), cover the hole with adhesive tape.



Recording a Programme Immediately

Before recording a programme, you must have preset the corresponding station (unless you are recording via an external video source). If you have not done so, refer to pages 12 and 13.

1 Switch on the television.

2 To monitor the programme being recorded, select the television channel reserved for use with your DVD-VCR (or the AV input if used).

3 Insert the cassette on which the programme is to be recorded, with the window visible and the safety tab intact or the opening covered with adhesive tape.
Result: The DVD-VCR is switched on automatically.

4 Select:
- The station to be recorded using the PROG (∧ or ∨) buttons or
- The AV1, AV2 or AUX source using the INPUT SEL. button for a satellite tuner or external video source
Result: The station number is displayed and the programme can be seen on the television.

5 Select the recording speed by pressing the SPEED button as required (see section on the left).

6 Hold REC (●) down for a while to start recording.
Result: The record indicator appears on the television and DVD-VCR display. An index is recorded on the tape (see page 22).

7 To stop recording, press ■ once.

➢
- If your DVD-VCR ejects the cassette when you start recording, check to make sure that the cassette's safety tab is intact or that the opening (created by a broken safety tab) is covered with adhesive tape.
- If you reach the end of the tape while recording, the cassette rewinds automatically.

Recording a Programme with Automatic Stop

This function enables you to record up to nine hours (LP) of programmes.
Your DVD-VCR stops automatically after the requested length of time.

1 Switch on the television.

2 To monitor the programme being recorded, select the television channel reserved for use with your DVD-VCR (or the AV input if used).

3 Insert the cassette on which the programme is to be recorded, with the window visible and the safety tab intact or the opening covered with adhesive tape.
Result: The DVD-VCR is switched on automatically.

4 Select:
- The station to be recorded using the PROG (∧ or ∨) buttons
or
- The AV1, AV2 or AUX source using the INPUT SEL. button for a satellite tuner or external video source
Result: The channel number is displayed and the programme can be seen on the television.

5 Select the recording speed by pressing the SPEED button as required (see page 18).

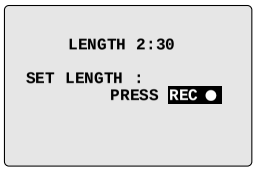
6 Hold the REC button (●) down for a while to start recording.
Result: The record indicator appears on the television screen and DVD-VCR display. An index is recorded on the tape

7 Press the REC button (●) several times to increase the recording time in:
- 30-minute intervals up to four hours
- 1-hour intervals up to nine hours
Result: The length is displayed on the television displays. The selected programme is recorded for the length of time requested. At the end of that time, the DVD-VCR stops recording automatically and power off.

8 If you wish to cancel the recording before the end, press ON/STANDBY.

☛ If the end of the tape is reached while recording:
- The recording stops and power off.

☛ This function is not available in DVD recording

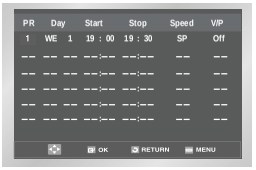


Using the Timer Programming Feature

The Timer Programming feature allows you to preset the DVD-VCR to record a programme up to one month before that programme is to be broadcast. Up to six programmes can be preset.

☛ ***Before presetting a recording, check that the date and time are correct.***

1 Insert the cassette and press TIMER on the remote control. Alternatively, you can also set the Timer program by selecting the PROG option in the setup menu.
Result: The TIMER PROGRAMMING menu is displayed.



2 Press ▶ to select the input source.

3 Select the required station by pressing the ▲,▼ buttons or INPUT SEL. to select the AV1, AV2 or AUX input sources.

4 Press ▶ to select the recording day.

5 Select the required day by pressing the ▲,▼ buttons.

6 Press ▶ to select the recording start time.

7 Select the required hour value by pressing the ▲,▼ buttons.

8 Press ▶ to select the minutes.

9 Select the required minute value by pressing the ▲,▼ buttons.

10 Press ▶ to select the recording stop time.

11 Select the required recording stop time by pressing the ▲,▼ buttons, following the same procedure as when selecting the recording start time.

12 Press ▶ to select the recording speed.

13 Press the ▲,▼ buttons to select the **SP** (Standard Play), **LP** (Long Play), **Auto** (Auto Tape speed Select) recording speeds.

14 Press ▶ to select VPS/PDC **On** or **Off**.

15 Press the ▲,▼ buttons to toggle between the VPS/PDC mode (marked **On**) and the non VPS/PDC mode (marked **Off**).

Using the Timer Programming Feature (Continued)

VPS(Video Programme System) / PDC(Programme Delivery Control System)

Depending on TV stations, VPS/PDC signals are transmitted with TV programmes. The VCR can control the timer recording start and end times by the VPS/PDC signals to assure the recording of a whole programme, covering any changes in the published broadcast time, that is, time shift, extension or interruption of the programme. If the TV programme is interrupted, during the VPS/PDC controlled timer recording,the recording will be automatically interrupted and resumed when the programme continues.

Important

The VPS/PDC function only works when the VPS/PDC signal is transmitted with the TV programme to be recorded. If the broadcasting station does not transmit the VPS/PDC signal, the timer recording will be done in the normal mode even if it was programmed in the VPS/PDC mode.

16 When you have finished, press the RETURN button.Repeat steps 2 to 16 to set another timer programme

17 When you have finished, press the RETURN button. Repeat steps 2 to 16 to set another timer programme.

18 Press the ON/STANDBY button to activate the timer.
Result: Before starting recording, the DVD-VCR compares the timer duration with the remaining time on the cassette.

➢ *Auto Tape Speed select. The DVD-VCR's "Auto Tape Speed select" function compares the duration of the timer recording to the actual recording time remaining on the tape loaded. If there is insufficient tape to complete a timer recording in AUTO mode, the DVD-VCR automatically switches to LP mode to record the whole programme.*

Checking a Preset Recording

You can check your preset recordings:

- ***When you have finished presetting the DVD-VCR***
- ***If you have forgotten which programmes will be recorded***

1 Press TIMER on the remote control.
Result: The **TIMER PROGRAMMING** menu is displayed.

2 Press the ▲or▼ button to select the required programme.

3 Press the ▶ button to select and ▲or▼ button to change any values as required.
For more details, refer to the previous page.

4 On completion, press RETURN twice.

Cancelling a Preset Recording

You can cancel any programmes that are:

- ***Incorrect***
- ***No longer required***

1 Press TIMER on the remote control.
Result: The **TIMER PROGRAMMING** menu is displayed.

2 Select the programme to be cancelled by pressing the ▲, ▼ buttons.

3 Press the CLEAR button to cancel the selected programme.
Result: All the recording information is deleted and the broadcast will not be recorded.

4 On completion, press RETURN twice.

Playing a Cassette

This function allows you to play back any pre-recorded cassette.

1 Switch on both the television and your DVD-VCR.

2 Insert the video cassette to be played. If the safety tab on the cassette is intact, press ▶II.
Otherwise, the cassette is played automatically.

➢ When a cassette is loaded, the tape position is optimized automatically to reduce disturbance (Digital Auto Tracking).
When playing a cassette, if the end of the tape is reached, the cassette is rewound automatically.
NTSC tapes can be played back but cannot be recorded with this DVD-VCR.

3

To...	Then press...
Stop the playback	■ (STOP).
Eject the cassette	⏏ (EJECT).

Adjusting Picture Alignment Manually

The Picture Adjustment feature allows you to adjust the alignment manually to obtain the best possible picture.

When noise bars or streaks appear during playback, adjust alignment manually by pressing the TRK buttons until the picture is clear and stable.

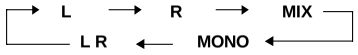
Result:
- The tracking bar appears.
- The image is adjusted.
- The tracking bar disappears when you release the button.

Selecting the Audio Output Mode

You can select the mode in which the sound is reproduced on the loudspeakers and AV outputs. The following options are available.

Option	Description
L	Used to listen to the sound on the left Hi-Fi channel.
R	Used to listen to the sound on the right Hi-Fi channel.
MIX	Used to listen to the mixed sound of the Hi-Fi and normal channels.
MONO	Used to listen to the sound on the normal mono channel.
L R	Used to listen to Hi-Fi stereo sound on the left and right channels. ➢ When playing back tapes recorded in Hi-Fi, the sound switches to Hi-Fi after five seconds of Mono.

To select the sound mode, simply press the AUDIO button on the remote control until the required option is displayed.



Playing a Cassette in Slow Motion

You can play a cassette in slow motion.

➢ *No sound is heard when playing back a cassette in slow motion.*

1 Press:
- ▶II to start playing the cassette
- ▶II button one more time to make still mode.
- ▶▶ to start SLOW mode.
- ◀◀ or ▶▶ button as many times as required to decrease or increase the speed respectively
- To return to the normal speed, press the ▶II button twice.

2 When playing back in slow motion, picture interference may occur.
Press the TRK buttons to minimize this effect.

☛ When you have been using the Slow Motion function for more than about two minutes, the DVD-VCR will automatically play to protect the:
- Cassette
- Video heads

Playing a Sequence Frame by Frame

You can

- ***Stop the cassette at a given frame (image)***
- ***Advance one frame at a time***

➢ *No sound is heard when playing back frame by frame.*

1 Press:
- ▶II to start playing the cassette
- ▶II button one more time to make still mode.
- F.ADV/STEP to advance frame by frame

2 To return to normal playback, press ▶II.

➢ *Vertical stability: When playing back frame by frame, interference may be seen on the screen. Press the TRK buttons to minimize this effect.*

Playing a Sequence at Variable Speeds

You can vary the playback speed using the Shuttle function (up to nine times the normal speed).

Example: ***You wish to analyse a sportsperson's technique, movement by movement.***

The Shuttle function is available on the Remote control

➢ *No sound is heard when playing a sequence at variable speeds.*

1 Press:
- ►II during playback
- SHUTTLE (<<) to play the cassette backwards
- SHUTTLE (>>) to play the cassette forwards

2 Each time you press a SHUTTLE button, the speed is changed as shown in the following illustration.

REVERSE PLAY X9	REVERSE PLAY X5	REVERSE PLAY X3	STILL	SLOW MOTION X1/10	SLOW MOTION X1/5	PLAY	PLAY X3	PLAY X5	PLAY X9

Searching for a Specific Sequence

Each time you record a cassette on this DVD-VCR, an "index" is automatically marked on the tape when recording starts.

The Search function allows you to fast-forward or rewind to a specific index and start playback from that point. Depending on the direction selected, the indexes are numbered as follows:

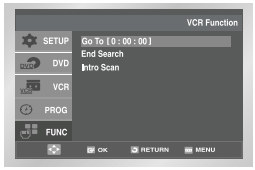
		↓		
etc.	*Prev Seq.*	*Seq. being played*	*Next Seq.*	*etc.*
2	*1*		*1*	*2*

➢ *This DVD-VCR uses a standard indexing system (VISS). As a result, it will recognize any indexes marked by other VCRs using the same system and vice versa.*

Go To [0:00:00] Stop

Use this feature when you want to search for the 0:00:00 counter position on a cassette. Press the CLEAR button at the point on the tape where you want to set the counter to 0:00:00.
The VCR will rewind or fast forward, searching for the 0:00:00 counter position, and then automatically stop at that position.

1 After pressing SEARCH, press the corresponding ▲, ▼ buttons until the **Go To [0:00:00]** option is selected.



2 Press the OK or ▶.

Searching for a Specific Sequence (Continued)

End Search

Use this feature when you want to search for a blank position to record a program on a cassette.

The VCR will fast forward, searching for a blank position, and then automatically stop at that position.If the VCR reaches the end of the tape during end search, the tape will be ejected.

1 After pressing SEARCH, press the corresponding ▲, ▼ button until the **End Search** option is selected.

2 Press the OK or ▶.

Intro Scan

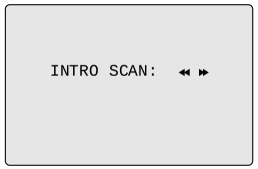
1 After pressing SEARCH, press the corresponding ▲, ▼ button until the **Intro Scan** option is selected.

2 Press the OK or ▶.

3 Press the ◀◀ or ▶▶ button depending on the direction where your desired programme is located.

4 When an Index mark is found the DVD-VCR will playback the tape for 5 seconds, after which it will continue searching for the next Index mark.

5 If you want to watch the tape from a particular Index, simply press ►II twice.



Index Skip Search

This feature will enable you to fast forward/rewind to a specific point on a tape: E.g. if you have recorded 3 different programmes on a tape and you have rewound the tape to the beginning, by using this feature you can go directly to the start of programme 2 simply by pressing the SEARCH button.

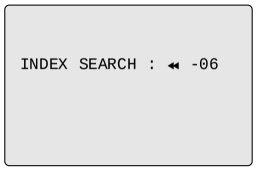
1 After pressing SEARCH, press the corresponding ▲, ▼ button until the **Intro Scan** option is selected.

2 Press the OK or ▶.

3 Press the ◀◀ or ▶▶ button twice more.
This will take you directly to the start of the desired programme is located.

4 These Index searches can be made forwards: (press ▶▶) or backwards: (press ◀◀).
(◀◀ -20 . . 0 . . +20 ▶▶)

5 To cancel an Index search simply press the ►II or ■ button.



➢ *Alternatively. Go To [0:00:00]. End search and Intro Scan can also be accessed by selecting FUNC option in Setup menu followed by selecting VCR Function mode.*

Using the Tape Counter

The tape counter:

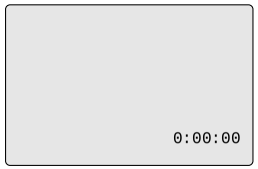
- ***Indicates the elapsed time in the play and record modes (hours, minutes and seconds)***
- ***Is reset when a cassette is inserted in the DVD-VCR***
- ***Allows you to find the beginning of a sequence easily***

☛ ***If the remaining time is to be calculated correctly, you must indicate the type of cassette being used.***

1 Insert a cassette in your DVD-VCR.

2 To set the tape counter to zero at the beginning of a sequence:

- Press DISPLAY. twice to display the counter
- Press CLEAR when you want to set the tape counter to zero



3 When you are ready,

- Start playback or Recording.
- Press the ■ button.
- To fast-froward or rewind to the sequence at which the counter was set to zero, press ◀◀ or ▶▶.

➢ Some DVD-VCR information, such as the counter, can be displayed on the television screen (unless you have deactivated the Screen messages mode; refer to page 17).

Press DISPLAY.:

- Once to display the current function, programme number, recording speed, date, time and counter
- Twice to display the counter only
- Three times to display the time remaining on the cassette
- Four times to clear the display

Connecting an RCA Audio/Video Input Cable

You can connect other audio/video equipment to your DVD-VCR using audio/video cables if the appropriate outputs are available on the equipment chosen.

Examples:

- ***You wish to copy a video cassette with the help of a second VCR.***
- ***You wish to play back and/or copy pictures taken with a camcorder .***

☛ *Make sure that both the television and the DVD-VCR are switched off before connecting the cables.*

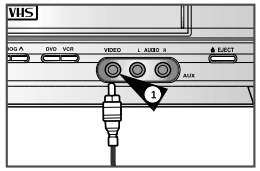
1 Connect one end of the RCA audio/video cable into the VIDEO INPUT socket on the front of the DVD-VCR.

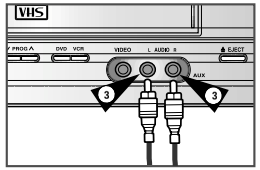
2 Plug the other end of the audio/video cable into the appropriate output connector on the other system (VCR or camcorder).

3 Connect one end of the RCA audio cable supplied into the AUDIO INPUT sockets on the front of the DVD-VCR.

➢ Take care to respect the colour coding of the left and right channels.

4 Plug the other end of the audio cable into the appropriate output connectors on the other system (VCR, camcorder or Hi-Fi sound system).





Using the Assemble Edit Function

This function allows you to start a new recording at a specific position on the cassette while maintaining a very smooth scene change.

1 Insert the cassette to be edited in your DVD-VCR.

2 Press the ▶II button to start playback.

3 When you reach the position from which you wish to start the new recording, press the ▶II button.

4 Press the F.ADV/STEP button again as often as necessary to advance frame by frame, until the exact recording position is located.

5 While the DVD-VCR is in still mode, hold the REC button (●) down for a while to activate the Assemble Edit function.

6 Select the source from which you wish to record by pressing:

- The PROG buttons for television channels
- The INPUT SEL. button for the AV1, AV2 or AUX input sources

7 Press the ▶II button to start recording.

8 When you have finished recording, press ■.

Recording from Another VCR or Camcorder

You can copy a cassette to your DVD-VCR from another video source, such as another VCR or a camcorder.

☛ *It is an infringement of copyright laws to copy prerecorded cassettes or to re-record them in any form without the permission of the owners of the corresponding copyright.*

1 Connect the DVD-VCR, from which the cassette is to be copied, to the appropriate SCART audio and video input connectors on the rear of your DVD-VCR, as indicated on page 8.

2 Insert a blank cassette in your DVD-VCR.

3 Insert the pre-recorded cassette in the other video source (VCR or camcorder).

4 Press the INPUT SEL. button to select the appropriate input on your DVD-VCR:

- AV1, AV2 for the SCART input
- AUX for the RCA input

5 Start playing back the cassette to be copied.

6 Hold REC (●) down for a while to start recording on your DVD-VCR.

7 When you have finished recording, press ■ on both VCR and DVD-VCR.

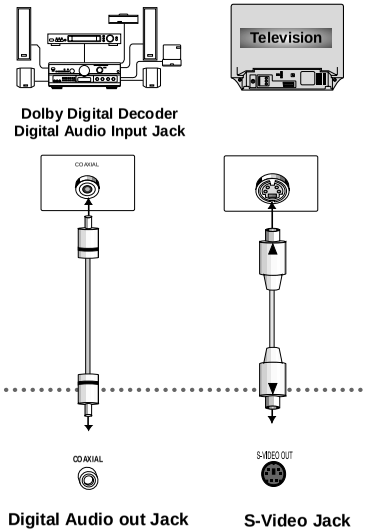
➢ If you wish to view the cassette being copied:

- Your DVD-VCR must be connected as usual to the television (see page 8 for further details)

Choosing a Connection

The following show examples of connections commonly used to connect the DVD -VCR player with a TV and other components. It is only available for DVD. The VCR out can not watch by this connection.

Connection to an Audio System **Connection to a Television**



Dolby Digital Decoder Digital Audio Input Jack

Digital Audio out Jack **S-Video Jack**

Setting Up the Language Features

If you set the player menu, disc menu, audio and subtitle language in advance, they will come up automatically every time you watch a movie.

Using the Disc Menu Language

1 With the unit in Stop mode, press the MENU button.

2 Select **DVD** using ▲,▼ buttons, then OK or ▶ button

3 Select **Language Setup** using ▲,▼ buttons, then press the OK or ▶ button.

4 Select **Disc Menu** using ▲,▼ buttons, then press the OK or ▶ button.

5 Use the ▲,▼ buttons to select **English**.
- Select “Others” if the language you want is not listed.
- If the selected language is not recorded on the disc, the default language of the disc will be displayed.

6 Press the OK button.
- English is selected and the screen returns to Language Setup menu.

7 Press RETURN to go back to previous menu or press MENU to exit the Setup menu.

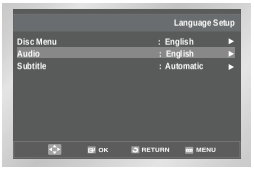
Setting Up the Language Features

Using the Audio Language

1 With the unit in Stop mode, press the MENU button.

2 Select **DVD** using ▲,▼ buttons, then OK or ▶ button.

3 Select **Language Setup** using ▲,▼ buttons, then press the OK or ▶ button.



4 Select **Audio** using ▲,▼ buttons, then press the OK or ▶button.

5 Press the ▲,▼ buttons to select **English**.
- Select “Original” if you want the default soundtrack language to be the original language the disc is recorded in.
- Select “Others” if the language you want is not listed.
- If the selected language is not recorded on the disc, the original language will be heard.

6 Press the OK button.
- English is selected and the screen returns to Language Setup menu.

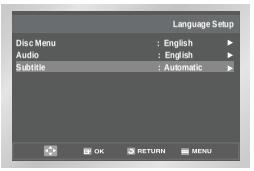
7 Press RETURN to go back to previous menu or press MENU to exit the Setup menu.

Using the Subtitle Language

1 With the unit in Stop mode, press the MENU button.

2 Select **DVD** using ▲,▼ buttons, then OK or ▶ button.

3 Select **Language Setup** using ▲,▼ buttons, then press the OK or ▶ button.



4 Select **Subtitle** using ▲,▼ buttons, then press the OK or ▶button.

5 Use the ▲,▼ buttons to select **English**.
- Select “Automatic” if you want the subtitle language to be the same as the language selected as the audio preference.

- Select “Others” if the language you want is not listed. Some discs may not contain the language you select as your initial language; in that case the disc will use its original language setting.

6 Press the OK button.
- English is selected and the screen returns to Language Setup menu.

7 Press RETURN to go back to previous menu or press MENU to exit the Setup menu.

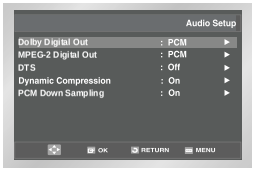
Setting Up the Audio Options

1 With the unit in Stop mode, press the MENU button.

2 Select **DVD** using ▲,▼ buttons, then OK or ▶ button.

3 Select **Audio Setup** using ▲,▼ buttons, then press the OK or ▶ button.

4 Use the ▲,▼ buttons to select the desired item. Then press the OK or ▶ button.



■ **Dolby Digital Out**

1. PCM : Converts to PCM(2CH) audio. Select PCM when using the Analog Audio Outputs.
2. Bitstream : Converts to Dolby Digital Bitstream (5.1CH). Select Bitstream when using the Digital Audio Output.

➢ Be sure to select the correct Digital Output or no audio will be heard.

■ **MPEG-2 Digital Out**

1. PCM : Converts to PCM(2CH) audio. Select PCM when using the Analog Audio Outputs.
2. Bitstream : Converts to MPEG-2 Digital Bitstream (5.1CH or 7.1CH).Select Bitstream when using the Digital Audio Output.

■ **DTS**

1. Off : Doesn't output digital signal.
2. On : Outputs DTS Bitstream via digital output only. Select DTS when connecting to a DTS Decoder.

■ **Dynamic Compression**

1. On : To select dynamic compression.
2. Off : To select the standard range.

■ **PCM Down Sampling**

1. On : Select this when the amplifier connected to the player is not 96KHz compatible. In this case, the 96KHz signals will be down converted to 48KHZ.
2. Off : Select this when the amplifier connected to the player is 96KHz compatible. In this case, all signals will be output without any changes.

➢ • How to make the SETUP menu disappear or return to previous menu screen during set up; Press MENU or RETURN button respectively.

• Manufactured under license from Dolby Laboratories. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories.

• "DTS" and "DTS Digital Out" are trademarks of Digital Theater Systems, Inc.

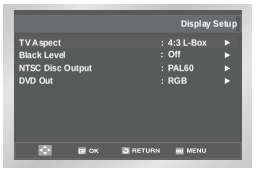
Setting Up the Display Options

1 With the unit in Stop mode, press the MENU button.

2 Select **DVD** using ▲,▼ buttons, then OK or ▶ button.

3 Select **Display Setup** using ▲,▼ buttons, then press the OK or ▶ button.

4 Use the ▲,▼ buttons to select the desired item. Then press the OK or ▶ button.



■ **TV Aspect**

Depending on the type of television you have, you may want to adjust the screen setting (aspect ratio).

1. 4:3 Letter Box : Select when you want to see the total 16:9 ratio screen DVD supplies, even though you have a TV with a 4:3 ratio screen. Black bars will appear at the top and bottom of the screen.
2. 4:3 Pan Scan : Select this for conventional size TVs when you want to see the central portion of the 16:9 screen. (Extreme left and right side of movie picture will be cut off.)
3. 16:9 Wide : You can view the full 16:9 picture on your widescreen TV.

■ **Black Level**

Adjusts the brightness of the screen.(On/Off)

• Black level function works on NTSC system only.

■ **NTSC Disc Output**

"NTSC" if the screen only has one NTSC-video entrance. If this is not the case, you can choose to leave " PAL60" as is.

■ **DVD Out**

RGB : Sends RGB signal from the SCART socket(AV1).

S-Video : Sends S-VIDEO signal from the S-Video jack.

Video : Sends COMPOSITE VIDEO signal from the Video jack and SCART socket(AV1).

➢ Press RETURN to go back to previous menu or press MENU to exit the setup menu.

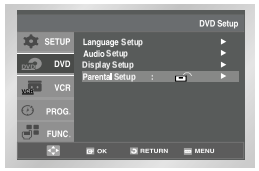
Setting Up the Parental Control

The Parental Control function works in conjunction with DVDs that have been assigned a rating - which helps you control the types of DVDs that your family watches.
There are up to 8 rating levels on a disc.

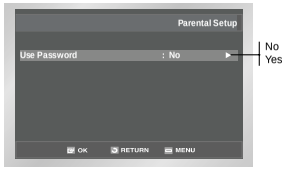
1 With the unit in Stop mode, press the MENU button.

2 Select **DVD** using ▲,▼ buttons, then OK or ▶ button.

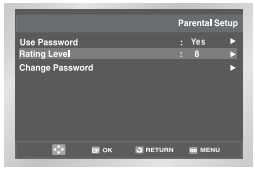
3 Select **Parental Setup** using ▲,▼ buttons, then press the OK or ▶ button.



4 Use OK or ▶ to select **Yes** if you want to use a password. The **Enter Password** screen appears.



5 Enter your password. The **Re-Enter Password** screen appears to confirm the password. Re-Enter the same password again. The Parental Control screen appears.



■ **About the Rating Level ;**

The Rating Level will work only when **Use Password** is set to Yes. To unlock the player, use ▲,▼ to select No. Use ▶ or OK to select **Rating Level**. Press OK.

- Use ▲or▼ to select the level(e.g. Level 6) and press OK. Discs that contain Level 7 will not be played back.
- To cancel the rating level, use ▶ or OK to select No in Use Password.

■ **About the Change Password ;**

- Use ▲or▼ to select Change Password. Press OK. The Change Password screen appears.
- Enter your new password. Re-Enter the new password again.

➢ • How to make the SETUP menu disappear or return to previous menu screen during set up; Press MENU or RETURN button respectively.

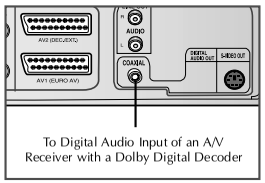
• If you have forgotten your password, see Forget Password in the Troubleshooting Guide.

A/V Receiver Connections

To take full advantage of the movie theater experience that DVD offers, you may want to connect your DVD-VCR to a complete Surround Sound system, including an A/V Receiver and 5.1CH Surround Sound speakers.

Before You Begin...

- *If your A/V receiver is equipped with a Dolby Digital Decoder, you have the option to bypass the DVD-VCR's built-in Dolby Digital Decoder. Use the Digital Audio Out connection below.*



1 **Digital Audio Out**

Connect a digital coaxial cable from the Digital coaxial Audio Out jack on the back panel of the DVD-VCR to the Digital coaxial Audio Input jack on your A/V Receiver.

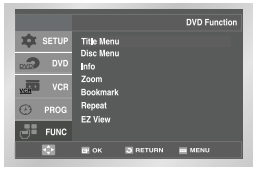
Setting up the DVD function

1 Press the MENU button during PLAY mode.

2 Select FUNC using ▲or▼ button, then Press the OK or ▶ button.

3 Select DVD Function using ▲or▼ button, then Press the OK or ▶ button.

4 use the ▲or▼ button to select the desired function, then press the OK or ▶ button.



■ **Title menu**

Two or more titles are recorded on some discs. If the title menu is recorded on the disc, you can select the desired title.

■ **Disc menu**

■ **Info**

Similar to Display Function, see pagexx.

■ **Zoom etc**

Special Playback Features

During DVD/VCD/CD playback you can select from the following special playback options. To resume normal playback, press the ▶II button.

1 **Still**
Press the ▶II button on the remote control during playback.
- The picture will still and the audio will mute.
- To resume playback, press the ▶II button.
- If the player is left in Still mode for 5 minutes, it will stop automatically.

2 **Frame Advance (Step)**
While in playback mode, press the F.ADV/STEP button on the remote control to advance one frame at a time.
- Audio is muted during Frame Advance mode.
- Press ▶II to resume normal playback.

NOTE: Frame Advance operates only in the forward direction.

3 **Skip Forward/Backward**
While a DVD/VCD or CD disc is in Play mode, press the Skip I◀◀ , ▶▶I buttons on the remote control or ◀◀ , ▶▶ buttons on the front panel to jump forward and backward through disc chapters/tracks.
- Skip ▶▶I will jump to the next chapter/track.
- Skip I◀◀ in quick succession will jump to the beginning of the current chapter/track.
- Press Skip I◀◀ in quick succession again in quick succession to jump to the beginning of the previous chapter/track.

Search Forward/Backward
While a disc is in Play mode, press and hold the ◀◀ / ▶▶ buttons on the remote control or front panel to visually search forward/backward at 2X - 4X - 8X - 16X - 32X - 128X speed. Press ▶II button to resume normal speed.
- For VCD/CD discs, the forward and backward search can only go up to -32X speed.

4 **Slow Motion**
During playback, press the ▶II button to pause the image. Then use the Search ▶▶ to play in slow motion at variable speeds.
- Each press increases the slow motion speed playback to 1/8, 1/4 or 1/2 normal speed.
- Audio is muted during slow motion playback.

5 **Stop/Resume**
- Press the Stop button once to stop playback. To resume the DVD/VCD/CD from the point where the disc stopped, press the ▶II button.
- Press the ■ button twice to stop playback completely. The next time you press ▶II, the disc will start over from the beginning.

Adjusting the Aspect Ratio (EZ View)

To play back using aspect ratio (DVD)

1 Press the EZ VIEW button.
- The screen size changes when the button is pressed repeatedly.
- The screen zoom mode operates differently depending on the screen setting in the initial DVD menu.
- To ensure correct operation of the EZ VIEW button, you should set the correct aspect ratio in the initial setup.

If you are using a 16:9 TV

■ **For 16:9 aspect ratio discs**

- **Wide Screen**
  Displays the content of the DVD title in 16:9 aspect ratio.
- **Screen Fit**
  The top and bottom of the screen are cut off. When playing a 2.35:1 aspect ratio disc, the black bars at the top and bottom of the screen will disappear. The picture will look vertically stretched. (Depending on the type of disc, the black bars may not disappear completely.)
- **Zoom Fit**
  The top, bottom, left and right of the screen are cut off and the central portion of the screen is enlarged.

■ **For 4:3 aspect ratio discs**

- **Normal Wide**
  Displays the content of the DVD title in 16:9 aspect ratio. The picture will look horizontally stretched.
- **Screen Fit**
  The top and bottom of the screen are cut off and the full screen appears. The picture will look vertically stretched.
- **Zoom Fit**
  The top, bottom, left and right of the screen are cut off and the central portion of the screen is enlarged.

If you are using a 4:3 TV

■ **For 16:9 aspect ratio discs**

- **4:3 Letter Box**
  Displays the content of the DVD title in 16:9 aspect ratio.
  The black bars will appear at the top and bottom of the screen.
- **4:3 Pan Scan**
  The left and right of the screen are cut off and displays the central portion of the 16:9 screen.
- **Screen Fit**
  The top and bottom of the screen are cut off and the full screen appears. The picture will look vertically stretched.
- **Zoom Fit**
  When a 4:3 DVD is viewed on a 16:9 TV, black bars will appear at the left and right of the screen in order to prevent the picture from looking horizontally stretched.

■ **For 4:3 aspect ratio discs**

- **Normal Screen**
  Displays the content of the DVD title in 4:3 aspect ratio.
- **Screen Fit**
  The top and bottom of the screen are cut off and the full screen appears. The picture would look vertically stretched.
- **Zoom Fit**
  The top, bottom, left and right of the screen are cut off and the central portion of the screen is enlarged.

➢ This function may behave differently depending on the type of disc.

Title/Chapter/Time Selection

To view the current Title, Chapter/Track, and counter position, press the DISPLAY button during playback. The Display screen can also be used to quickly choose a title, chapter/track, or playing time when Playing a DVD/VCD/CD.

1 During DVD/VCD/CD playback, press the DISPLAY button on the remote control.
- For VCD 2.0, the display is only available in menu off mode, which is selected by DISC MENU button.

2 Use the ▲ or ▼ button to select the desired item.

3 Use the ◀ or ▶ button to make the desired setup and then press the OK button.
- you may use the number buttons of the remote control to directly access a title, chapter/track or to start playback from the desired time.

4 To make the screen disappear, press the DISPLAY button again.

DVD

VCD

CD

TITLE — To access the desired title when there is more than one in the disc. For example, if there is more than one movie on a DVD, each movie will be identified.

CHAPTER / TRACK — Most of DVD discs are recorded in chapters so that you can quickly find a specific passage (similar to tracks on VCD and audio CD).

TIME — Allows playback of the film from a desired time. You must enter the starting time as a reference.

AUDIO — Refers to the language of the film soundtrack. In the example, the soundtrack is played in English 5.1CH. A DVD disc can have up to eight different soundtracks.

SUBTITLE — Refers to the subtitle languages available in the disc. You will be able to choose the subtitles language or, if you prefer, turn them off from the screen. A DVD disc can have up to 32 different subtitles.

3D SOUND — A surround sound effect is generated using only two front speakers.

➢ For VCD 2.0, the DISC MENU button is used to select Menu On or MENU Off mode.

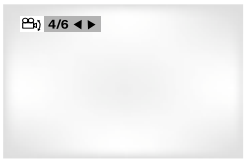
Angle View

Some DVD Movies provide you with various camera angle views on the same scene while they are showing. To activate the feature press the ANGLE Button.

1 **Check the Angle Icon**
You'll see the Angle Icon while watching a DVD with multi Angles available.

2 **View Angle Menu Options**
When the Angle Icon comes up to the screen press the Angle button to see the Angle menu.

3 **Select an Angle option**
Press the ◀, ▶ buttons to select a camera angle you may wish to see.



Subtitle

Some DVDs provide subtitles in one or more languages. You can use the SUBTITLE button to quickly view and change settings.

1 **Open Subtitle Menu**
During playback, press the SUBTITLE button.

2 **Set Subtitle Language**
Use the ◀, ▶ buttons to select from the available subtitle languages.
• Subtitle languages are represented by abbreviations.

3 **Activate Subtitles**
Use the ▲,▼ buttons to turn On or Off subtitles.
• The default is "Off".

A to B Repeat

A to B Repeat feature enables you to repeat the designated section on a DVD/VCD or CD. To activate, mark where to start(A) and where to end(B) of the section you want to watch.

1 **Select A-B Repeat Function**
Press the REPEAT button while in Play mode, then use the ◀, ▶ buttons to select A-B Repeat.
• When you select A-B Repeat, "A-" will be highlighted.
NOTE : The menu will display "Track" in place of "Chapter" if you are playing a CD.

2 **Mark the Starting Point**
Press the OK button at the beginning of the segment you want to repeat (Point A).
• Once you select Point A, "B" will be highlighted.
NOTE : The minimum AB Repeat time is 5 seconds.

3 **Mark the Ending Point**
Press the OK button again at the end of the segment you want to repeat (Point B).
• The segment will begin repeating in a continuous loop.

4 **Cancel A-B Repeat**
Press the REPEAT button to open the Repeat Menu, use the ◀, ▶ buttons to highlight "Off," then press the OK button.
• It is available to press CLEAR button on the remote controller in order to stop REPEAT play.

DVD

VCD/CD

➢ For 2.0 VCD, the A-B Repeat Function can only be activated when the menu Off mode is selected by DISC MENU button.

Repeat Chapter/Title

You can repeat a single chapter/track or a complete title/disc.

1 **Open Repeat Menu**
Press the REPEAT button while in Play mode to open the Repeat menu.
• The current Repeat mode will be highlighted.

2 **Select "Chapter/Track"**
Use the ◀, ▶ buttons to select "Chapter/Track".
• When you select Chapter/Track Repeat, "Chapter/Track" will be highlighted.

3 **Repeat Chapter/Track**
Press the OK button to repeat the current chapter or track.

4 **Select "Title/Disc"**
Use the ◀, ▶ buttons to select "Title/Disc".
• When you select Title/Disc Repeat, "Title/Disc" will be highlighted.

5 **Repeat Title/Disc**
Press the OK button to repeat the title or disc.

➢ For 2.0 VCD, the repeat function can only be activated when the Menu Off mode is selected by DISC MENU button.

Audio

Multiple language/audio setup options, such as Dolby Digital 5.1, Dolby Pro Logic, or LPCM 2 Channel audio, are available on some DVDs. You can use the AUDIO button to quickly view and select the options available on a disc.

1 **Open the Audio Menu**
During playback, press the AUDIO button on the remote control.

2 **Select DVD Audio Track**
Use the ◀, ▶ buttons to select the desired language/audio setup on the DVD.
• Languages are represented by abbreviations, e.g. "ENG" for "English."

3 **Select VCD/CD Sound Channel**
Use the ◀, ▶ buttons to select the different audio channel (Stereo, Left or Right).

DVD

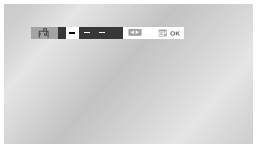
VCD/CD

Marks

Up to three Bookmarks can be inserted for a given DVD, allowing you to quickly jump to your favorite scene or song.

1 Open Mark Menu
During playback, press the MARK button on the remote control.

The “MARK" header will be displayed on the screen.



2 Select Mark Place holder
Use the ◀, ▶ buttons to move to one of the three mark placeholders (- - -).
• The placeholder you select

3 Set the Mark
Keep on playing the DVD up to the scene you want to mark, then press the OK button. The placeholder (-) will change to a number (1, 2 or 3).

• You may continue to set up to three marks.

• Press the MARK button when complete.

• Depending on the disc, the mark function may not work.
• If no button on the remote control are pressed for 10 seconds, the "MARK" header display will disappear. Press the MARK button on the remote control to display the "MARK" header again.

4 Play Mark

• During playback, press the MARK button on the remote control.

• Use the ◀, ▶ buttons to move to a previously set bookmark.

• Press the Play/Still button to play the mark.

• Press the CLEAR button to cancel the mark.

• Press the MARK button again to exit the mark menu.

MP3/WMA Play

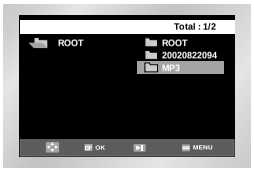
If you insert an MP3/WMA Disc into the DVD player, you can see the folder directory.

- *Select the desired folder in the root directory.*
- *Use the OK or ▶II button to select the desired folder.*

MP3/WMA Play Function

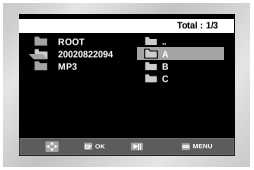
1 Press the OK or ▶II button, the selected music file will be played back.

Up to 8 music folders can be displayed at a time. If you have more than 8 folders on a disc, press the ▼ button to display them on the screen.



2 Use the ▲,▼ buttons to select the desired music folder, then press OK.

Press the ▲,▼ buttons again to select a music file. Press the OK button to begin playback of a music file.



MP3/WMA Play

Program/Random playback

1 Press the MODE button in STOP mode to display the RANDOM and PROGRAM options.

2 Use the ◀ or ▶ button to select between RANDOM and PROGRAM, then press the OK button.

➢ • Press the REPEAT button in PLAY mode to hear the music continuously and press it once again to release.

CD-R MP3/WMA discs

When playing CD-R/MP3 or WMA discs, please follow all the recommendations for CD-R above, plus the comments below:

■ **Your MP3 or WMA files should be ISO 9660 or JOLIET format.**

ISO 9660 format and Joliet MP3 or WMA files are compatible with Microsoft's DOS and Windows, and with Apple's Mac. These two formats are the most widely used.

■ **When naming your MP3 or WMA files do not exceed 8 characters, and place ".mp3, .wma" as the file extension.**

General name format of: Title.mp3. or Title.wma. When composing your title, make sure that you use 8 characters or less, have no spaces in the name, and avoid the use of special characters including: (.,/,\,=,+).

■ **Use a decompression transfer rate of at least 128Kbps when recording MP3 files.**

Sound quality with MP3 files basically depends on the rate of compression/decompression you choose. Getting audio CD quality sound requires an analog/digital sampling rate, that is conversion to MP3 format, of at least 128Kbps and up to 160Kbps. However, choosing higher rates, like 192Kbps or more, only rarely give better sound quality. Conversely, files with decompression rates below 128Kbps will not be played properly.

■ **Use a decompression transfer rate of at least 64Kbps when recording WMA files.**

Sound quality with WMA files basically depends on the rate of compression/decompression you choose. Getting audio CD quality sound requires an analog/digital sampling rate, that is conversion to WMA format, of at least 64Kbps and up to 192Kbps. Conversely, files with decompression rates below 64Kbps or over 192Kbps will not be played properly.

■ **Do not try recording copyright protected MP3 files.**

Certain "securized" files are encrypted and code protected to prevent illegal copying.
These files are of the following types: Windows MediaTM (registered trade mark of Microsoft Inc) and SDMITM (registered trade mark of The SDMI Foundation). You cannot copy such files.

■ **Important :**

The above recommendations cannot be taken as a guarantee that the DVD player will play MP3 recordings, or as an assurance of sound quality. You should note that certain technologies and methods for MP3 file recording on CD-Rs prevent optimal playback of these files on your DVD player (degraded sound quality and in some cases, inability of the player to read the files).

■ This unit can play a maximum of 500 files and 300 folders per disc.

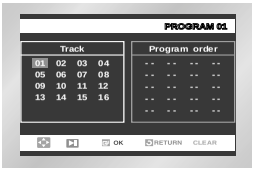
Program Play & Random Play

Program Play (CD/MP3/WMA)

1 Press the MODE button in STOP mode.

2 Use the ◀, ▶ buttons to select PROGRAM.
Press the OK button.

3 Use the ▲, ▼,◀, ▶ buttons to select the first track to add to the program.
Press the OK button. The selection numbers appear in the Program Order box.Repeat to place additional track in the Program Order box.



4 Press the ▶II button.
The disc will be played in programmed order.

Random Play (CD/MP3/WMA)

1 Press the MODE button in STOP mode.

2 Use the ◀, ▶ buttons to select RANDOM.
Press the OK button.
The disc will be played in random order.

➢ • Depending on the disc, the Program and Random Play functions may not work.
• To resume normal play, press the CLEAR button.
• This unit can support a maximum of 99 programmed order.
• Program and Random options can only be called out when a file name is highlighted in the file list.

Picture CD (JPEG) Playback

1 Open the disc tray.

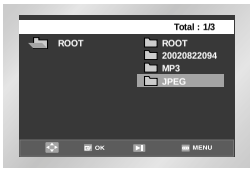
2 Load the disc on the tray.
Load the disc with the labeled side up.

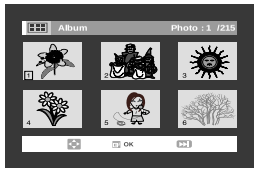
3 Close the tray.
- The tray closes and you should get a screen that looks like the one below.

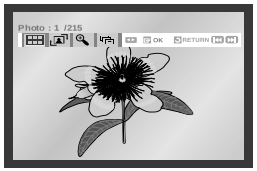
• Use the ▲, ▼ buttons on the remote controller to select the picture you want to view and then press the OK button.

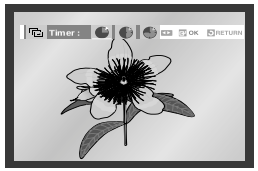
• To see the next 6 pictures in Album screen, press the ▶▶I button.

• To see the previous 6 pictures in Album screen, press the I◀◀ button.









MEMO

5. Disassembly and Reassembly

5-1 Cabinet and PCB

5-1-1 Cabinet Top Removal

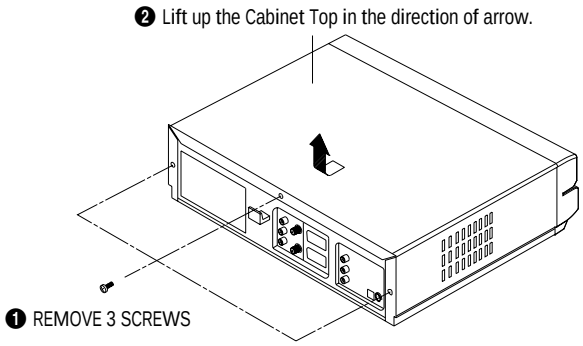


Fig. 5-1 Cabinet Top Removal

5-1-2 Ass'y Bottom Cover Removal

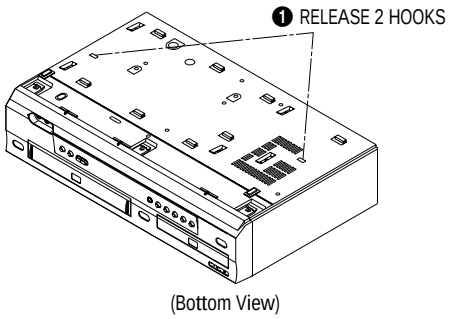


Fig. 5-2 Ass'y Bottom Cover Removal

5-1-3 Ass'y Front Panel Removal

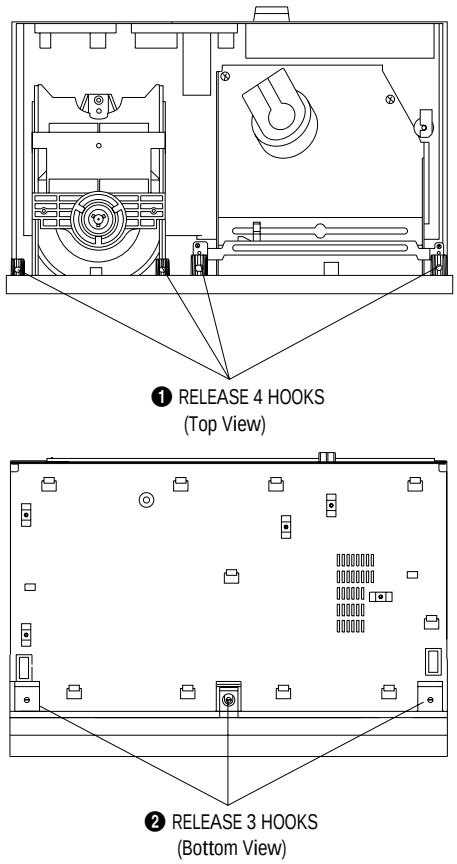


Fig. 5-3 Ass'y Front Panel Removal

5-1-4 Function PCB Removal

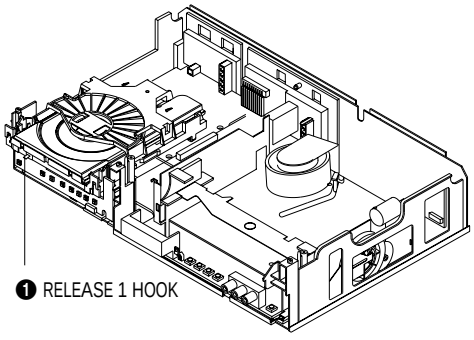


Fig. 5-4 Function PCB Removal

5-1-5 Chassis Removal

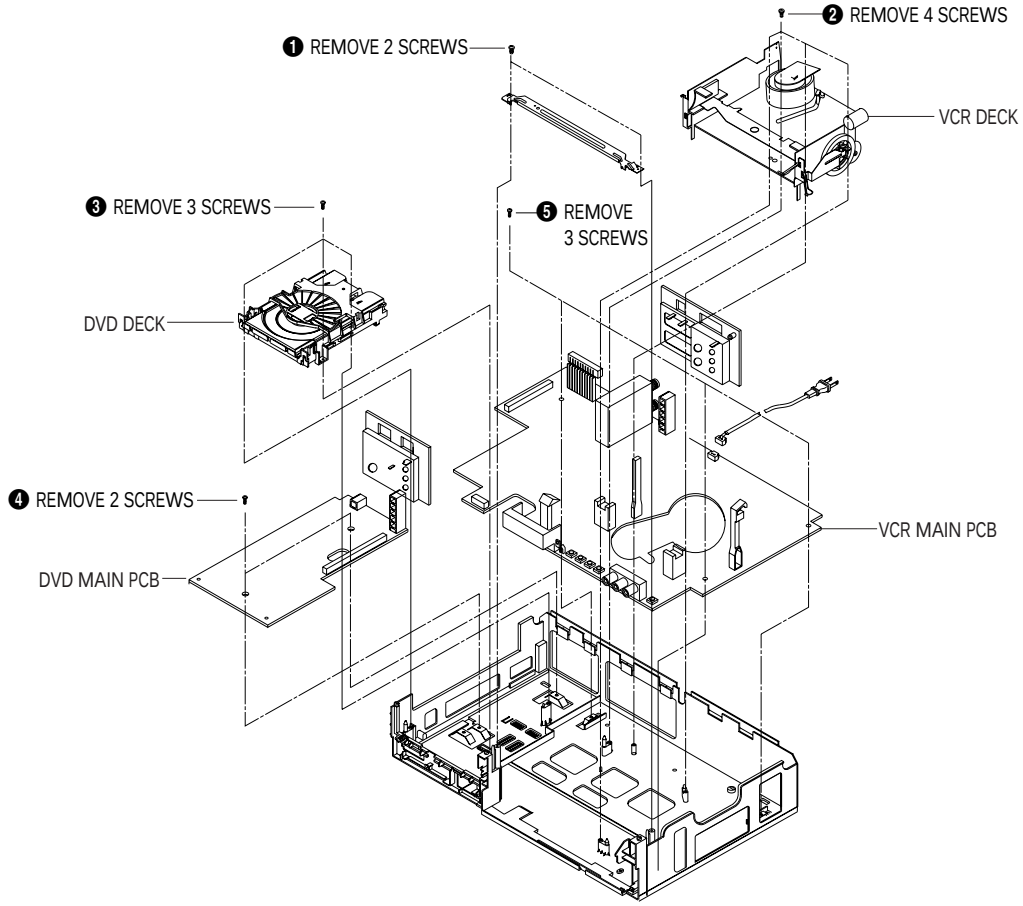


Fig. 5-5 Chassis Removal

5-1-6 VCR Main PCB Removal

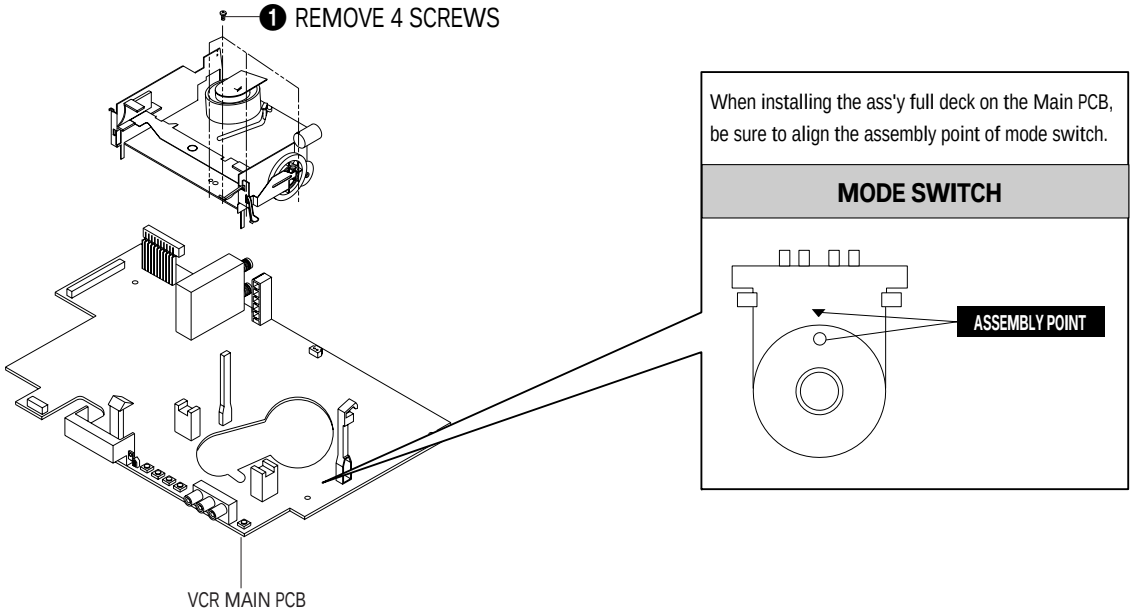

❶ REMOVE 4 SCREWS
When installing the ass'y full deck on the Main PCB, be sure to align the assembly point of mode switch.
MODE SWITCH
ASSEMBLY POINT
VCR MAIN PCB

Fig. 5-6 VCR Main PCB Removal

5-2 Circuit Board Locations

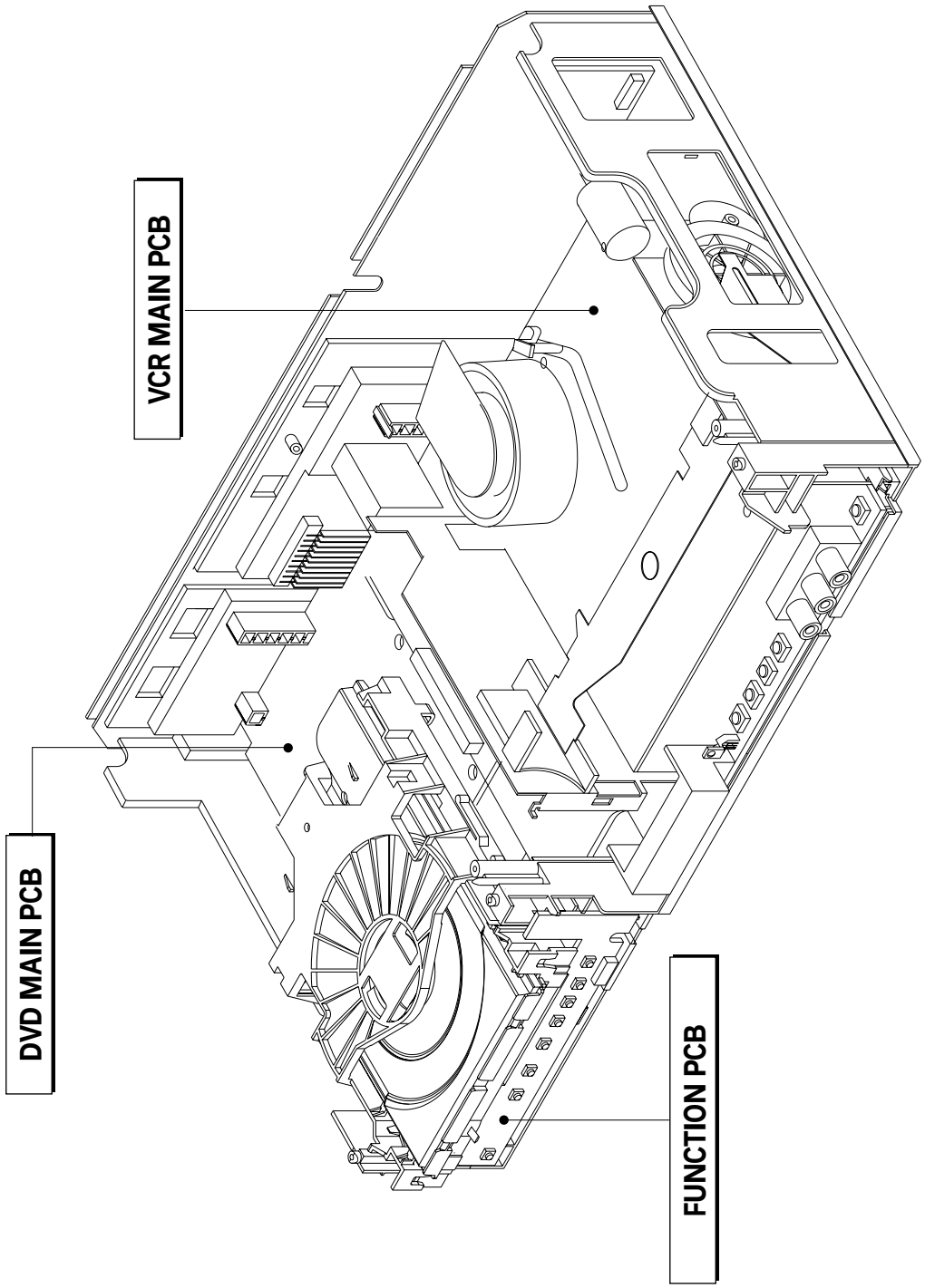


Fig. 5-7 Circuit Board Locations

5-3 VCR Deck Parts Locations

5-3-1 Top View

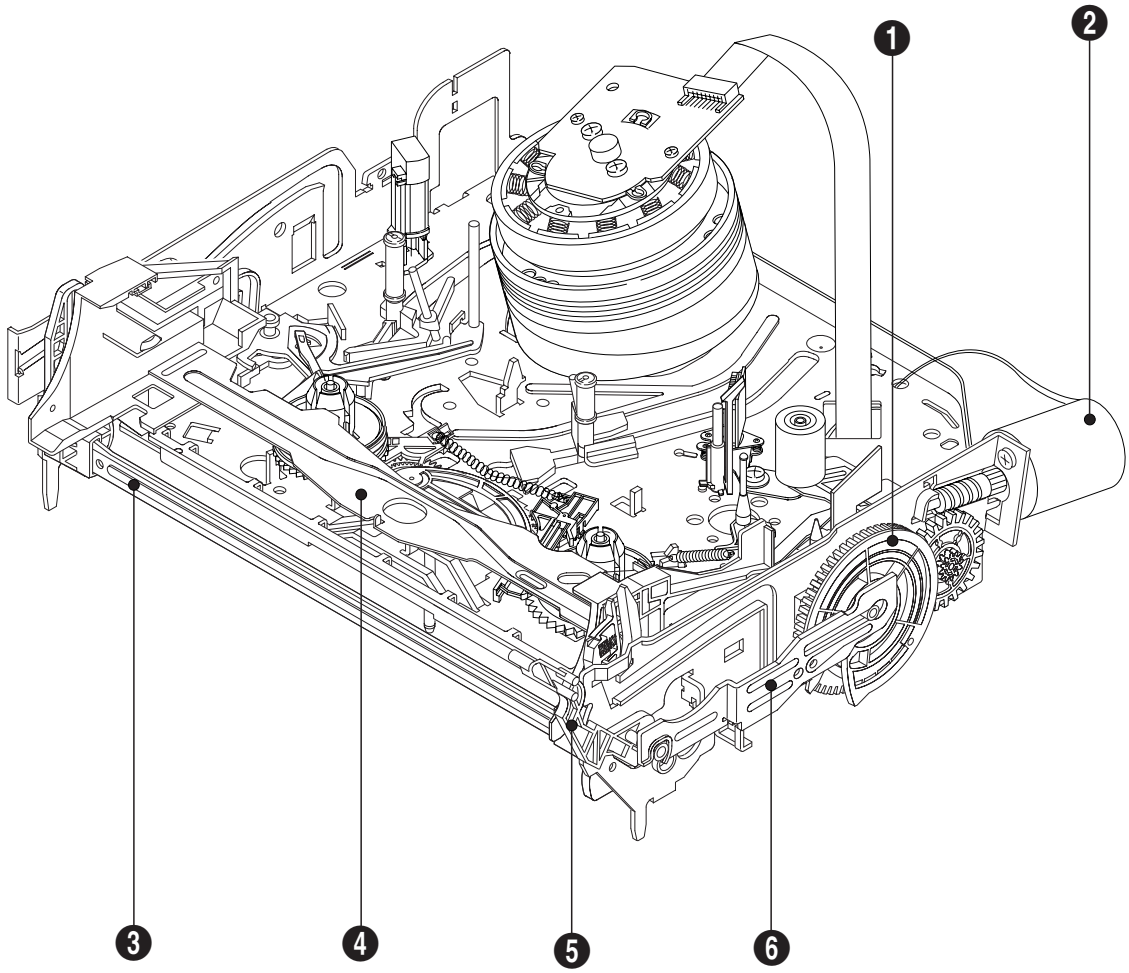


Fig. 5-8 Top parts Location-1

❶ GEAR FL CAM
❷ MOTOR LOADING ASS'Y
❸ LEVER FL ARM ASS'Y
❹ HOLDER FL CASSETTE ASS'Y
❺ LEVER FL DOOR
❻ SLIDER FL DRIVE

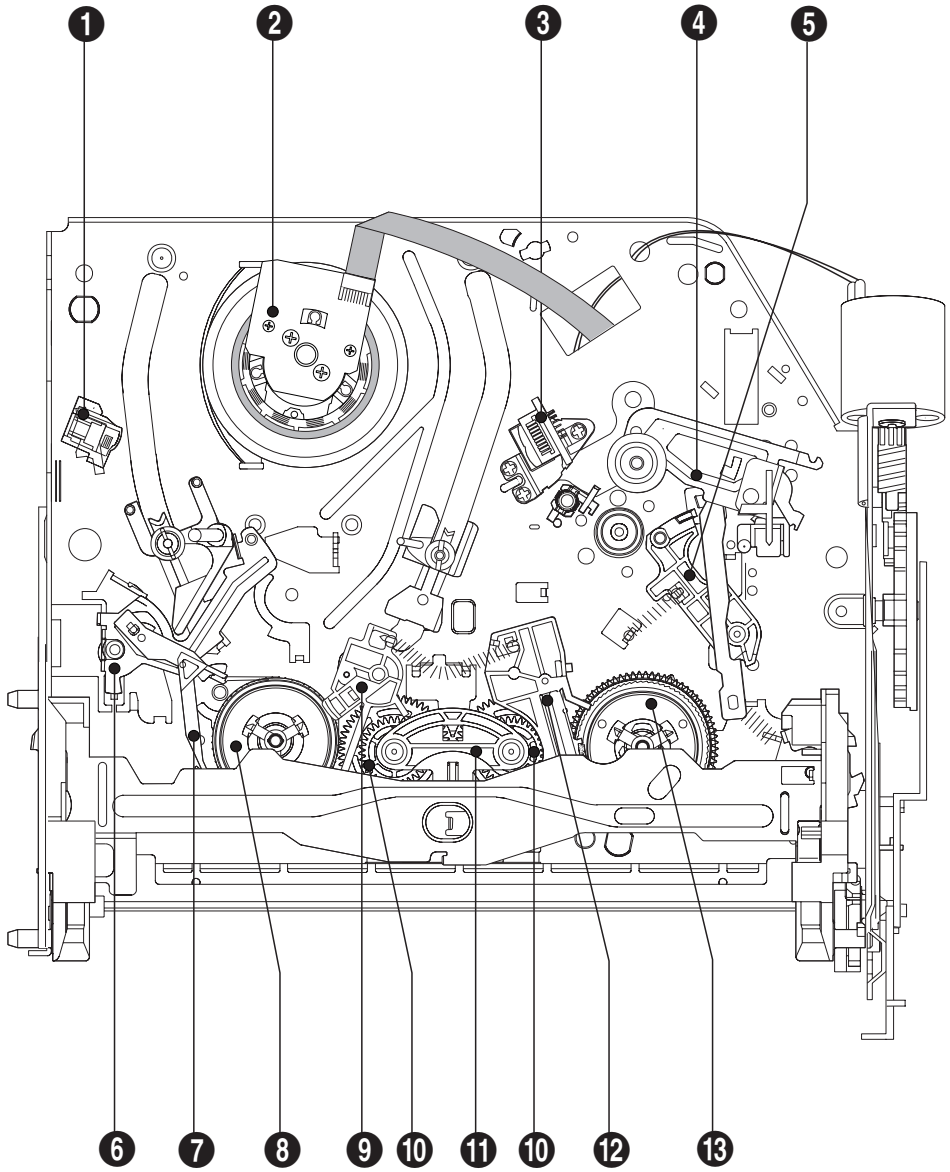


Fig. 5-9 Top Parts Location-2

1. FE HEAD
2. CYLINDER ASS'Y
3. ACE HEAD ASS'Y
4. LEVER UNIT PINCH ASS'Y
5. LEVER #9 GUIDE ASS'Y
6. LEVER TENSION ASS'Y
7. BAND BRAKE ASS'Y
8. DISK S REEL
9. LEVER S BRAKE ASS'Y
10. GEAR IDLE
11. LEVER IDLE
12. LEVER T BRAKE ASS'Y
13. DISK T REEL

5-3-2 Bottom View

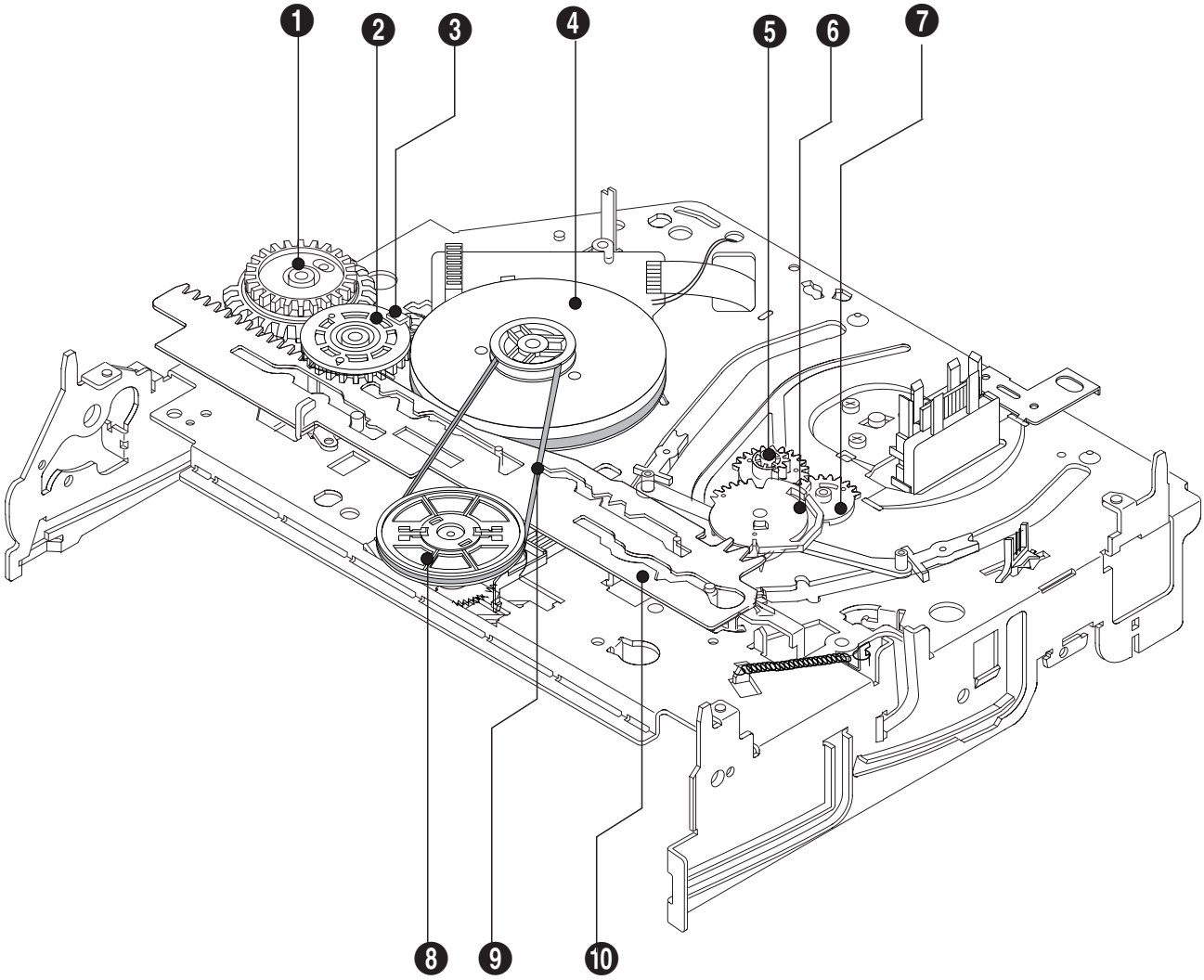


Fig. 5-10 Bottom Parts Location

1. GEAR JOINT 1
2. GEAR JOINT 2
3. BRAKET GEAR
4. MOTOR CAPSTAN ASS'Y
5. LEVER T LOAD ASS'Y
6. GEAR LOADING DRIVE
7. LEVER S LOAD ASS'Y
8. HOLDER CLUTCH ASS'Y
9. BELT PULLEY
10. SLIDER CAM

5-4 VCR Deck

5-4-1 Holder FL Cassette Ass'y Removal

1) Pull the Holder FL Cassette Ass'y ❶ to the eject position.
2) Pull the Holder FL Cassette Ass'y ❶ as grasping the Holder FL Cassette Ass'y ❶ and Lever FL Cassette-R ❷ in the same time to release hooking from Main Base until the Boss [A] of Holder FL Cassette Ass'y ❶ is taken out from the Rail [B].
3) Lift the Holder FL Cassette Ass'y ❶, in this time, you have to grasp the Lever FL Cassette-R ❷ Continuously until the Holder FL Cassette Ass'y ❶ is taken out completely.

Note : Be sure to insert Lever FL Cassette-R ❷ in the direction of "A" to prevent separation and breakage of the Lever FL Cassette-R ❷ at disassembling and reassembling.

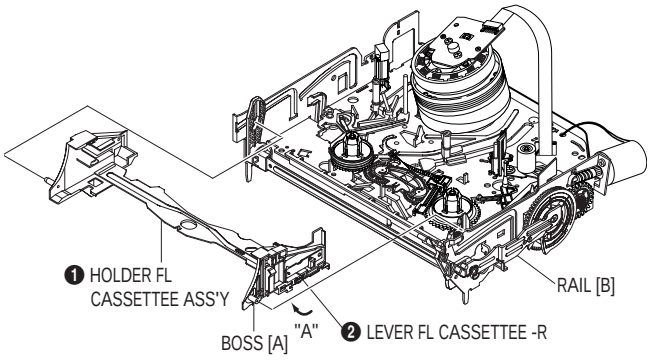


Fig. 5-11 Holder FL Cassette Ass'y Removal

5-4-2 Lever FL Arm Ass'y Removal

1) Push the hole "A" in the direction of arrow "B" use the pin.(about Dia. 2.5)
2) Pull out the Lever FL Arm Ass'y ❶ from the Boss of Main Base.
3) Remove the Lever FL Arm Ass'y ❶ in the direction of arrow "C".

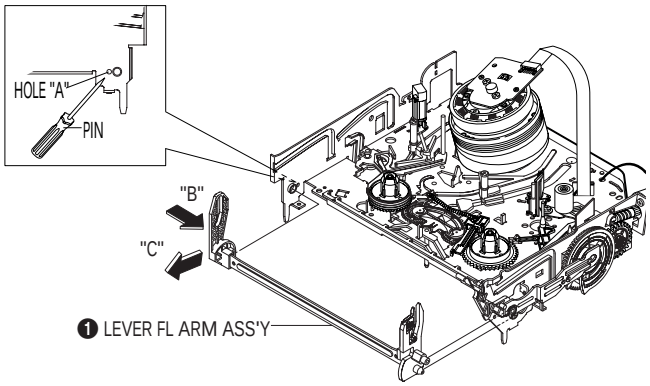


Fig. 5-12 Lever FL Arm Ass'y Removal

5-4-3 Lever FL Door Removal

1) Release the Hook ❷ and Remove the Lever FL Door ❶ in the direction of arrow "A".

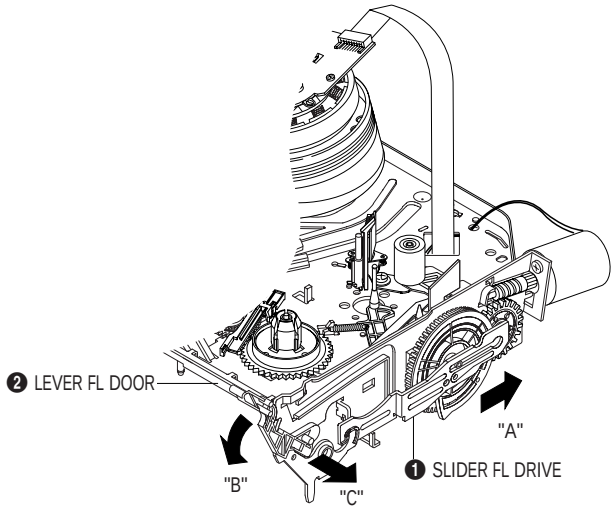


Fig. 5-13 Lever FL Door Removal

5-4-4 Slider FL Drive, Gear FL Cam Removal

1) Pull the Slider FL Drive ❶ to the front direction.
2) Remove the Slider FL Drive ❶ in the direction of arrow. (Refer to Fig. 5-13)
3) Remove the Gear FL cam ❷.

Note : When reinstalling be sure to reassemble Slider FL drive ❶ after you insert the Boss of Lever FL ARM-R in Groove of Slider Fl drive ❶.

Assembly : Align the Gear FL Cam ❶ with the Gear worm wheel Post as shown drawing.
(Refer to Timing point)

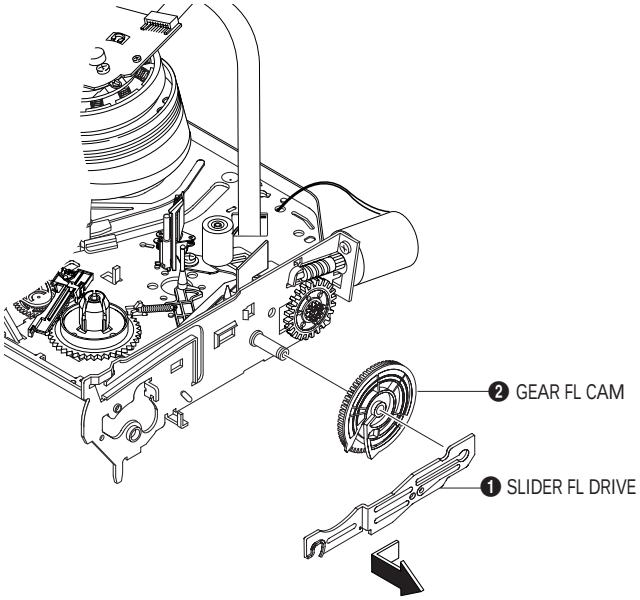


Fig. 5-14 Slider FL Drive Removal

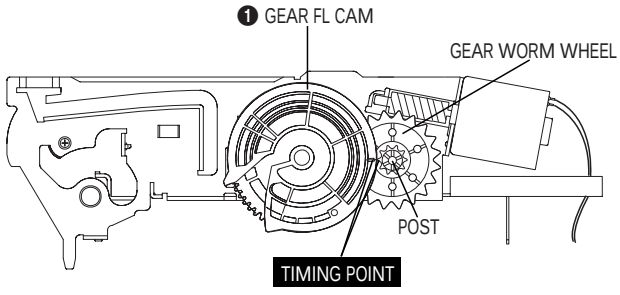


Fig. 5-15 Gear FL Cam, Gear Worm

5-4-5 Gear Worm Wheel Removal

1) Remove the Gear Worm wheel ❶.

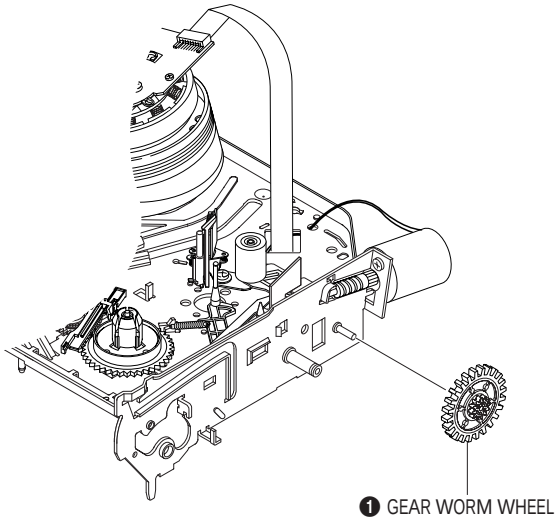


Fig. 5-16 Gear Worm Wheel Removal

5-4-6 Cable Flat Removal

1) Remove the Drum connecting part of Cable Flat ❶ from Connector Waffer ❷.

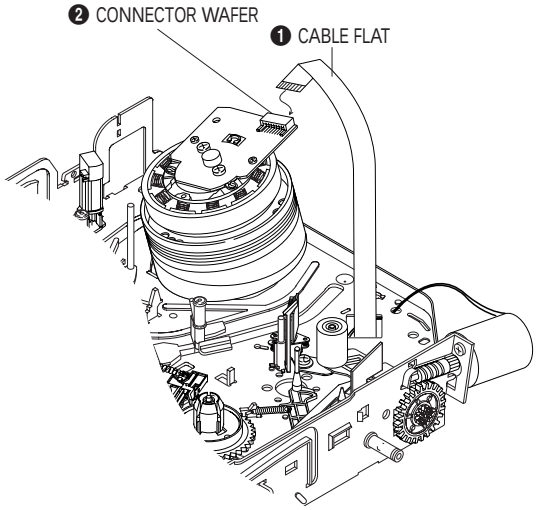


Fig. 5-17 Cable Flat Removal

5-4-7 Motor Loading Ass'y Removal

1) Remove the screw ❶.
2) Remove the Motor Loading Ass'y ❷.

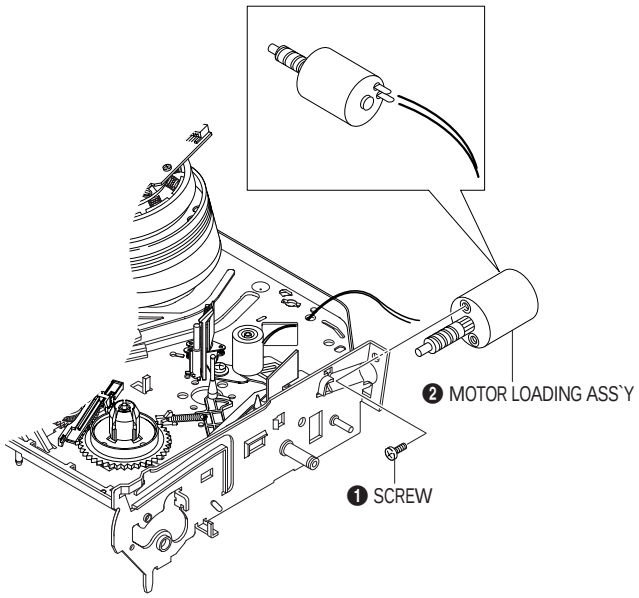


Fig.5-18 Motor Loading Ass'y Removal

5-4-8 Bracket Gear, Gear Joint 2, 1 Removal

1) Remove the SCREW ❶.
2) Remove the Bracket Gear ❷.
3) Remove the Gear Joint 2 ❸.
4) Remove the Gear Joint 1 ❹.

Assembly :
1) Be sure to align dot mark of Gear Joint 1 ❶ with dot mark of Gear Joint 2 ❷ as shown Fig 5-20. (Refer to Timing point1)
2) Confirm the Timing Point 2 of the Gear Joint 2 ❷ and Slider Cam ❸.

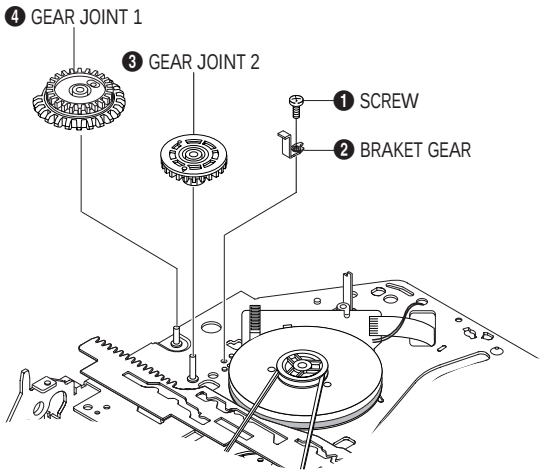


Fig. 5-19 Bracket Gear, Gear Joint 1,2 Removal

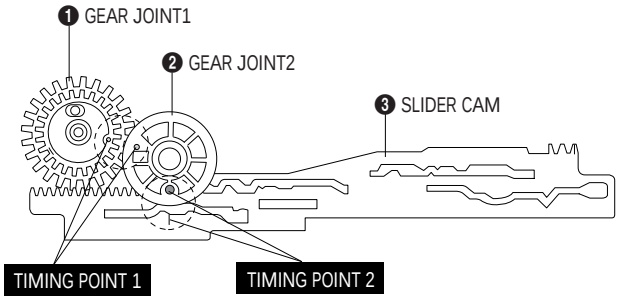


Fig. 5-20 Gear Joint 1,2 Assembly

5-4-9 Gear Loading Drive, Slider Cam, Lever Load S, T Ass'y Removal

1) Remove the Belt Pulley. (Refer to Fig. 5-38)
2) Remove the Gear Loading Drive ❶ after releasing Hook [A] in the direction arrow as shown in detail drawing.
3) Remove the Slider Cam ❷.
4) Remove the Lever Load S Ass'y ❸ & Lever Load T Ass'y ❹.

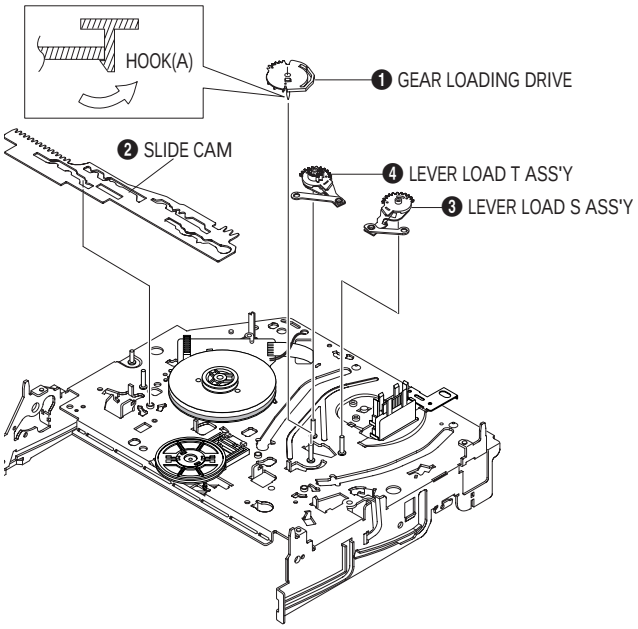


Fig. 5-21 Gear Loading Drive, Slider Cam, Lever T, S Load Ass'y Removal

5-4-10 Gear Loading Drive, Slider Cam, Lever Load S, T Ass'y Assembly

1) When reinstalling, be sure to align dot of Lever Load T Ass'y ❶ with dot of Lever Load S Ass'y ❷ as shown in drawing, (Refer to Timing Point 1).
2) Insert the Pin A,B,C,D into the Slider Cam ❸ hole,
3) Be sure to align dot of Lever Load T ❶ and dot of Gear Loading Drive ❹, (Refer to Timing Point 2).
4) Aline dot of Gear Loading drive ❹ with mark of Slider Cam ❸ as shown in drawing(Refer to Timing Point 3).

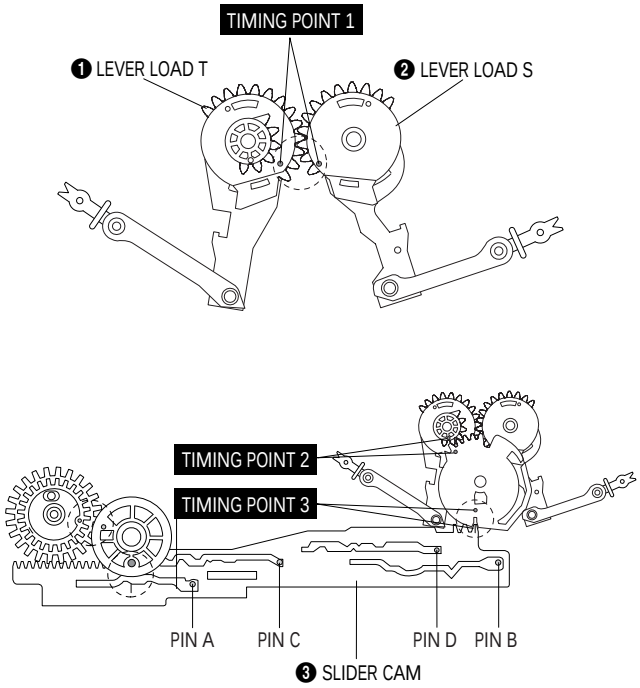


Fig. 5-22 Gear Loading Drive, Slider Cam, Lever Load S, T Ass'y Assembly

5-4-11 Lever Pinch Drive, Lever Tension Drive Removal

1) Remove the Lever Pinch Drive ❶, Lever Tension Drive ❷.

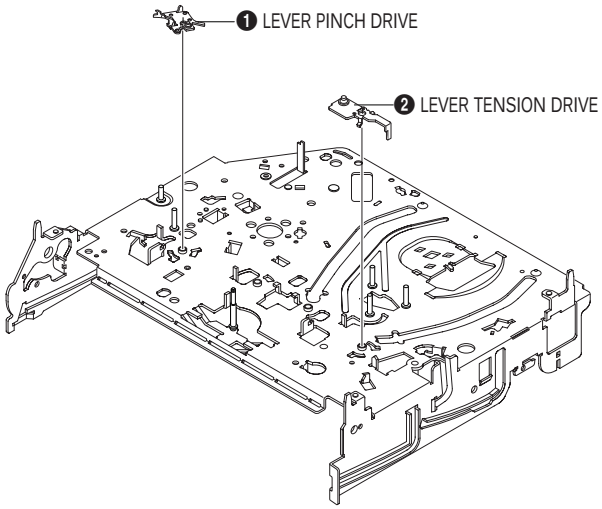


Fig. 5-23 Lever Pinch Drive, Lever Tension Drive Removal

5-4-12 Lever Tension Ass'y, Band Brake Ass'y Removal

1) Remove the Lever Brake S Ass'y (Refer to Fig 5-25).
2) Remove the Spring Tension Lever ❶.
3) Rotate stopper of Main Base in the direction of arrow "A".
4) Lift the Lever Tension Ass'y ❷ & Band brake Ass'y ❸.

Note :

1) When replacing the Lever Tension Ass'y ❷, be sure to apply Grease on the post,
2) Take care not to touch stain on the felt side, and not to be folder and broken Band brake Ass'y
3) After Lever Tension Ass'y seated, Rotate stopper of Main Base to the Mark[B].

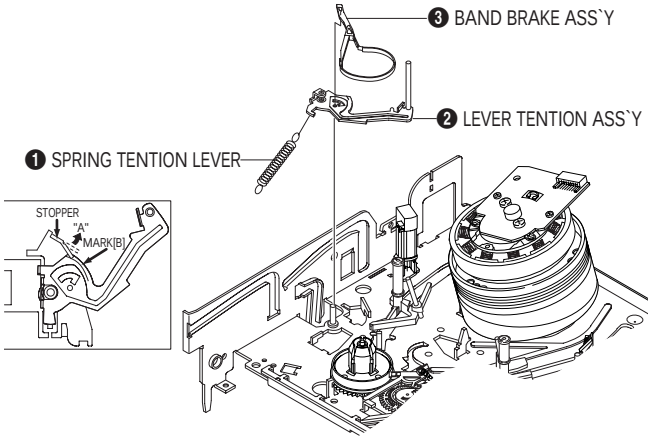


Fig. 5-24 Lever Tension Ass'y, Band Brake Ass'y Removal

5-4-13 Lever Brake S, T Ass'y Removal

1) Release the Hook [A] and the Hook [B], [C] in the direction of arrow as shown in Fig 5-25.
2) Lift the Lever S, T Brake Ass'y ❶, ❷ with spring brake ❸.

Assembly :
1)Assembly the Lever S Brake Ass'y ❶ on the Main Base.
2)Assembly the Lever T Brake Ass'y ❷ with spring brake ❸.

Note : Take extreme care not to be folded and transformed Spring Brake at removing or reinstalling.

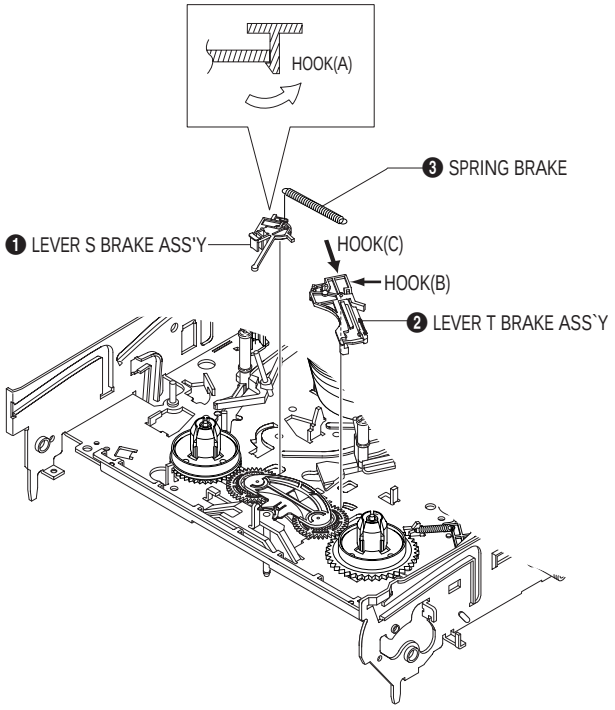


Fig. 5-25 Lever Brake S, T Ass'y Removal

5-4-14 Gear Idle Ass'y Removal

1) Push the Lever Idle ❶ in the direction of arrow "A", "B".
2) Lift the Lever Idle ❶.

Assembly :
1) Apply oil in two Bosses of Lever Idle ❶.
2) Assemble the Gear Idle ❷ with the Lever Idle ❶.

Note : When replacing the Gear Idle ❷, be sure to add oil in the boss of Lever Idle ❶.

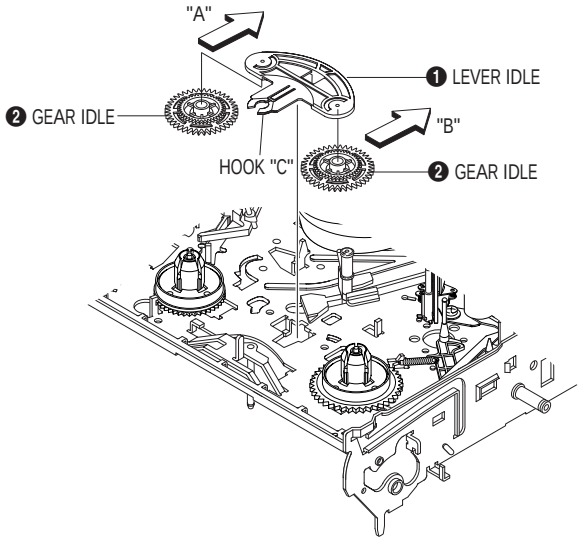


Fig. 5-26 Gear Idle Ass'y Removal

5-4-15 Disk S, T Reel Removal

1) Lift the Disk S, T Reel ❶, ❷.

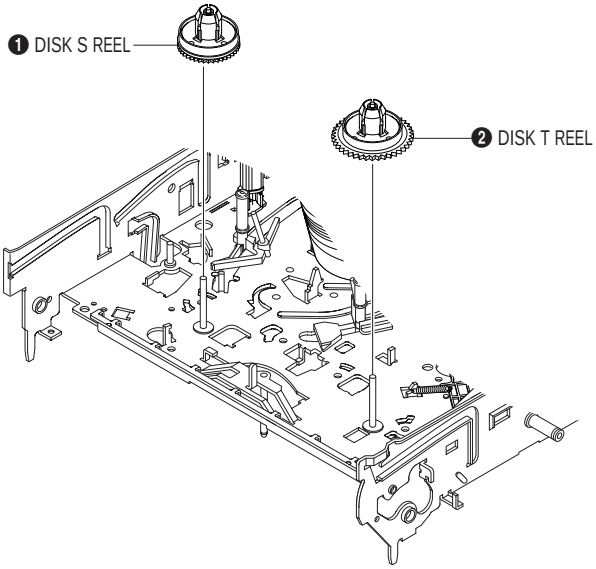
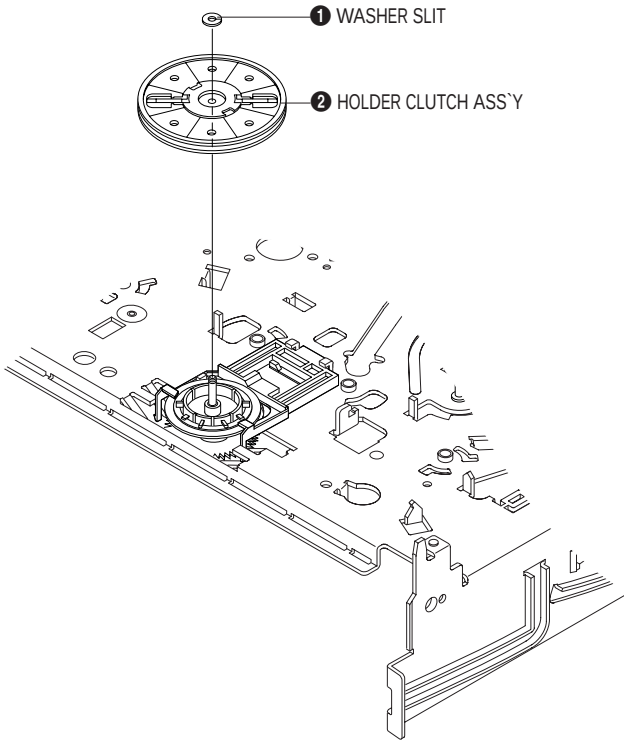


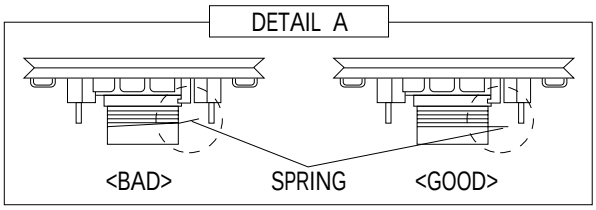
Fig. 5-27 Disk S, T Reel Removal

5-4-16 Holder Clutch Ass'y Removal

1) Remove the Washer Slit ❶.
2) Lift the Holder Clutch Ass'y ❷.

Note : When you reinstall Holder Clutch Ass'y
1) Check the condition of spring as shown in detail A.
2) Don't push Holder Clutch Ass'y down with excessive force Just insert Holder Clutch Ass'y into post center with dead force and Rotate it smoothly. Be sure to confirm that spring is in the slit of Gear Center Ass'y as shown in detail B.





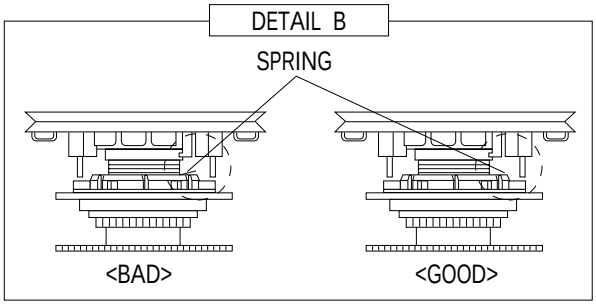


Fig. 5-28 Holder Clutch Ass'y Removal

5-4-17 Lever Up Down Ass'y, Gear Center Ass'y Removal

1) Remove the 2 hooks in the direction of arrow as shown Fig. 5-28 and lift the Lever Up Down Ass'y ❶.
2) Lift the Gear Center Ass'y ❷.

Assembly :
1) Insert the Lever Up Down Ass'y ❶ in the rectangular holes on Main Base as shown in Fig 5-30.
2) Lift the Lever Up Down Ass'y ❶ about 35°. (Refer to Fig 5-30)
3) Insert Ring of the Gear Center Ass'y ❷ in the Guide of the Lever Up Down Ass'y ❶.
4) Insert the Gear Center Ass'y ❷ in the post on Main Base.
5) Push down the Lever Up Down Ass'y ❶ for locking of the Hook.

Note :
1) Take care not to separate and sentence does not mark sense.
2) Be sure to confirm that Ring of the Gear Center Ass'y ❷ is in the Guide of the Lever Up Down Ass'y ❶ after finishing assembly of Lever Up Down Ass'y ❶ and Gear Center Ass'y ❷.

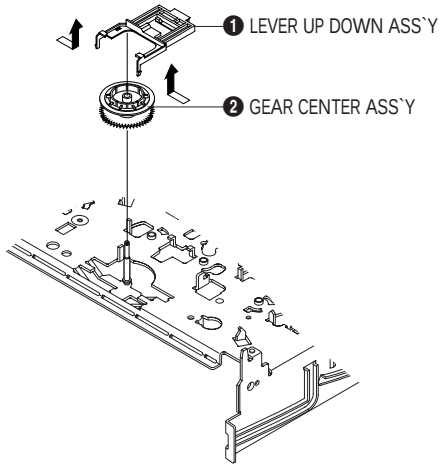


Fig. 5-29 Lever Up Down Ass'y Removal

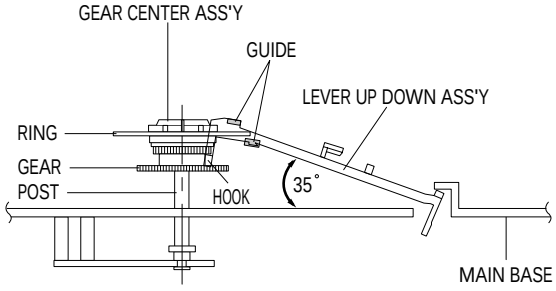


Fig. 5-30 Lever Up Down Ass'y Removal

5-4-18 Guide Cassette Door Removal

1) Lift the Hook [A].
2) Rotate the Guide Cassette Door ❶ in the direction of arrow.

Note : After reinstalling the Guide Cassette Door ❶ sure the Hook [A].

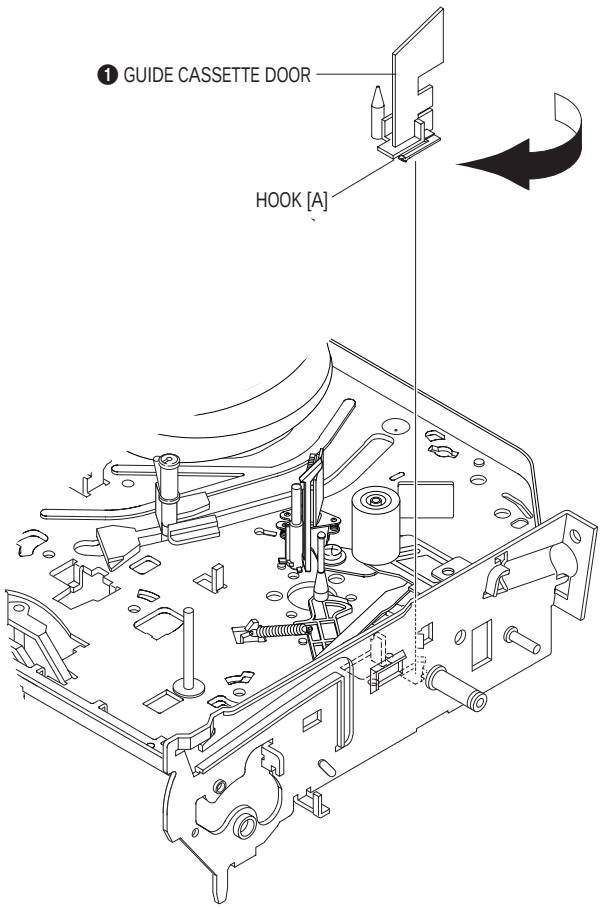


Fig. 5-31 Guide Cassette Door Removal

5-4-19 Lever Unit Pinch Ass'y, Plate Joint, Spring Pinch Drive Removal

1) Lift the Unit Pinch Ass'y ❶.
2) Remove the Plate Joint ❷ from Lever Pinch Drive.
3) Remove the Spring Pinch Drive ❸.

Note :
1) Take extreme care not to touch the grease on the Roller Pinch.
2) When reinstalling, be sure to apply grease on the post pinch roller.

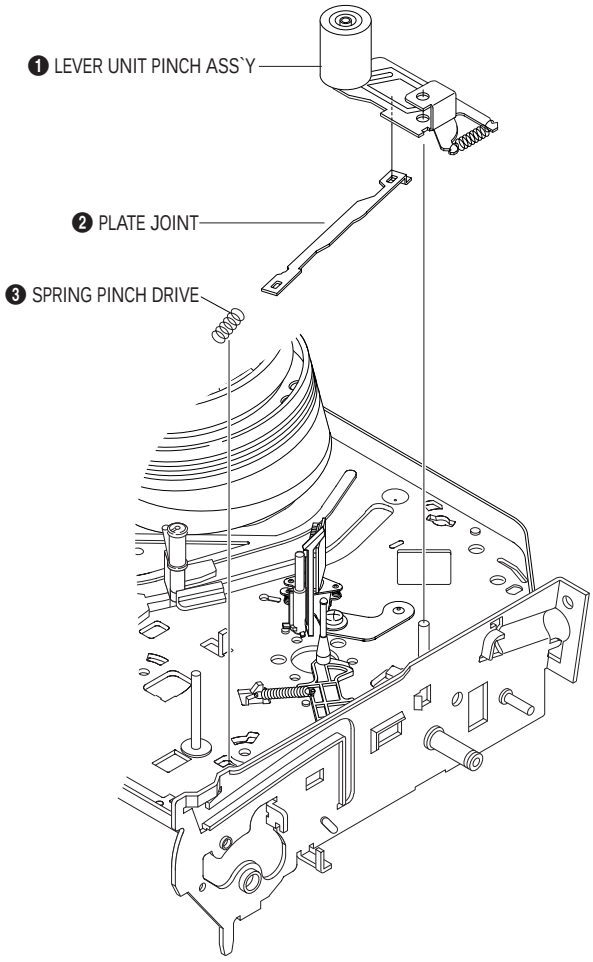


Fig. 5-32 Lever Unit Pinch Ass'y, Plate Joint, Spring Pinch Drive Removal

5-4-20 Lever #9 Guide Ass'y Removal

1) Remove the Spring #9 Guide ❶.
2) Lift the Spring #9 Guide Ass'y ❷ in the direction of arrow "A".

Note :
1) Take extreme care not to get grease on the tape Guide Post.
2) After reinstalling, check the bottom side of the Post #9 Guide to the top side of Main Base.

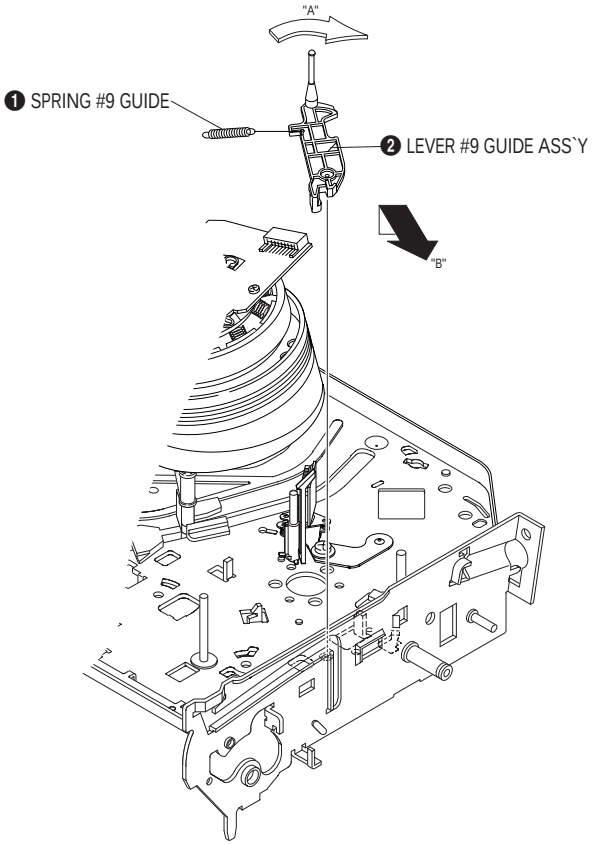


Fig. 5-33 Lever #9 Guide Ass'y Removal

5-4-21 FE Head Removal

1) Remove the screw ❶.
2) Lift the FE Head ❷.

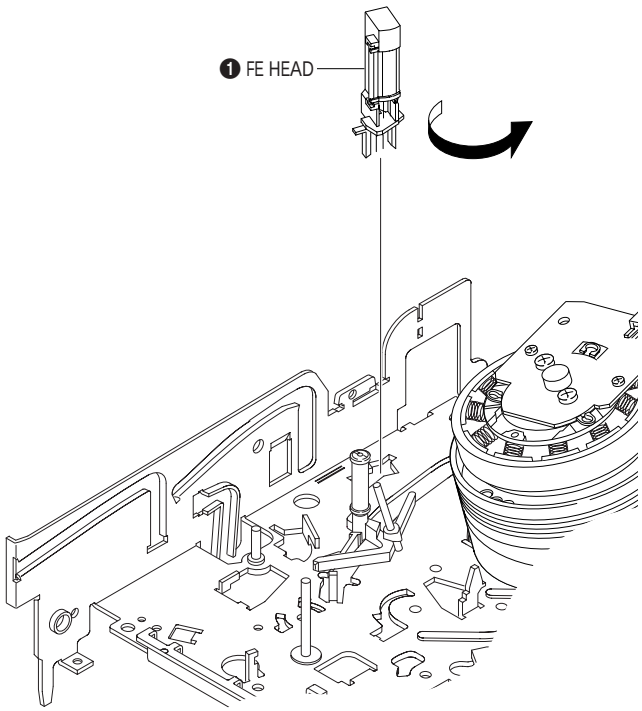


Fig. 5-34 FE Head Removal

5-4-22 ACE Head Removal

1) Pull out the FPC from connector of ACE Head Ass'y ❷.
2) Remove the screw ❶.
3) Lift the ACE Head Ass'y ❷.

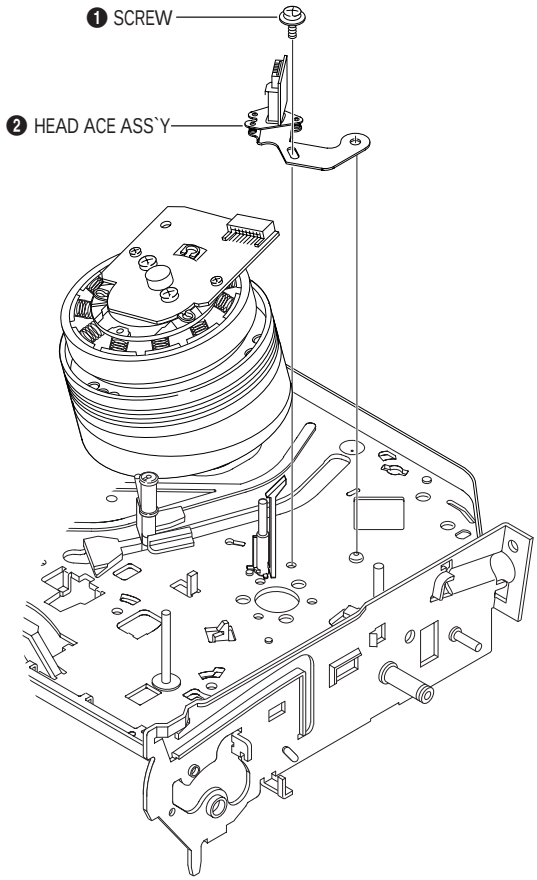


Fig. 5-35 ACE Head Removal

5-4-23 Slider S, T Ass'y Removal

1) Move the Slider S, T Ass'y ❶, ❷ to slot, and then lift it to remove. (Refer to arrow)

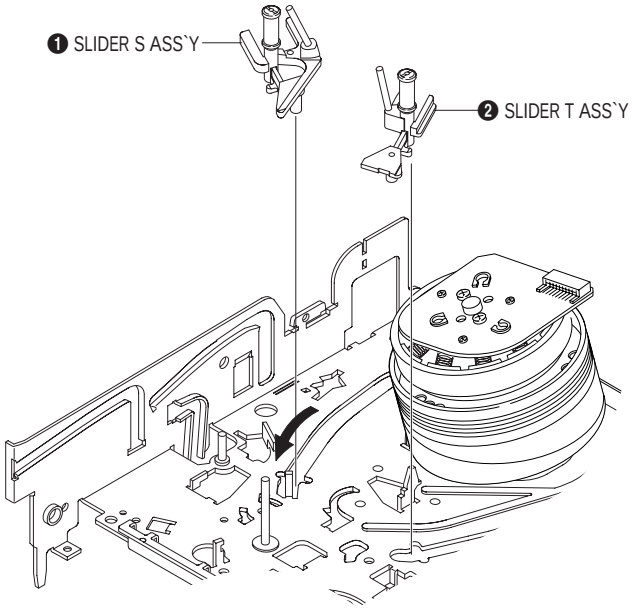


Fig. 5-36 Slider S, T Ass'y Removal

5-4-24 Plate Ground Deck, Cylinder Ass'y Removal

1) Remove the 3 Screws ❶.
2) Lift the Plate Ground Deck ❷.
3) Lift the Cylinder Ass'y ❸.

Assembly :
1) Match the 3 holes in the bottom of Cylinder ass'y ❸ to the 3 holes of Main Base as attending not to drop or knock the Cylinder ass'y ❸.
2) Tighten the 1 Screw ❶.
3) Match the Plate Ground Deck ❷ to the Hole of Base Main.
4) Tighten the other 2 Screws ❶.

Note :
1) Take care not to touch the Cylinder Ass'y ❸ and the tape guide post at reinstalling.
2) When reinstalling, Don't push down too much on Screw Driver.

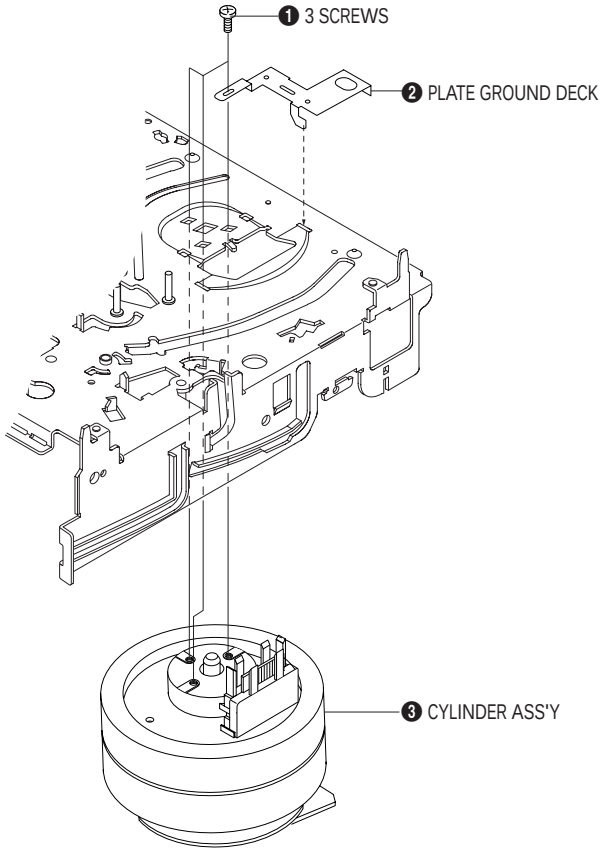


Fig. 5-37 Plate Ground Deck, Cylinder Ass'y Removal

5-4-25 Belt Pulley Removal

1) Remove the Belt Pulley ❶.

Note : Take extreme care not to get grease on Belt Pulley ❶ at assembling or reassembling.

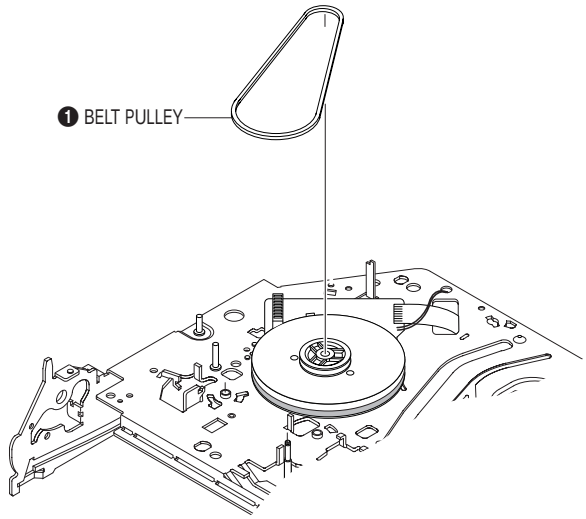


Fig. 5-38 Belt Pulley Removal

5-4-26 Damper Capstan Removal

1) Lift the Hook in the direction of arrow use the Flat Tip. (Refer to Fig. 5-39)
2) Rotate the Damper Capstan in the direction of allow

Note : Damper Capstan use the Sankyo Capstan Motor (FQVB65) Only.

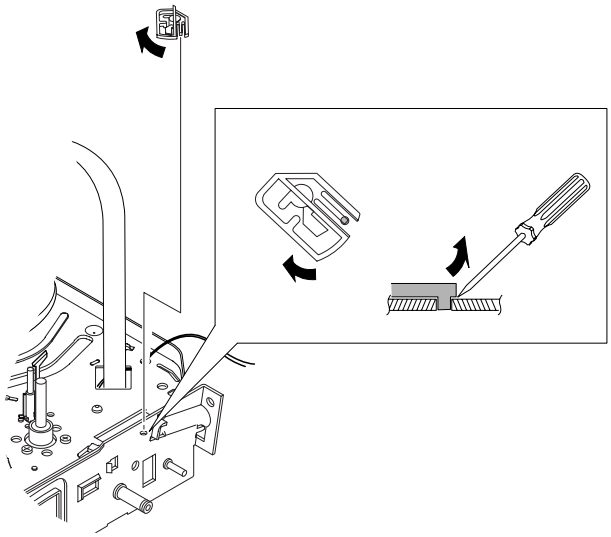


Fig. 5-39 Damper Capstan Removal

5-4-27 Motor Capstan Ass'y Removal

1) Remove the 3 Screws ❶.
2) Remove the Motor Capstan Ass'y ❷.

Assembly :
1) Match the 3 holes of Motor Capstan Ass'y ❷ to the 3 holes of Main Base. Be careful not to drop or knock the Motor Capstan Ass'y ❷.
2) Tighten the 3 Screws ❶ in the direction of arrow as shown detail drawing.

Note : After tightening screws, check if there is gap between the head of screws and the top side of Main Base. There should have no gap between the head of screws and the top side of Main Base.
After reinstalling, adjusting the tape transport system again.

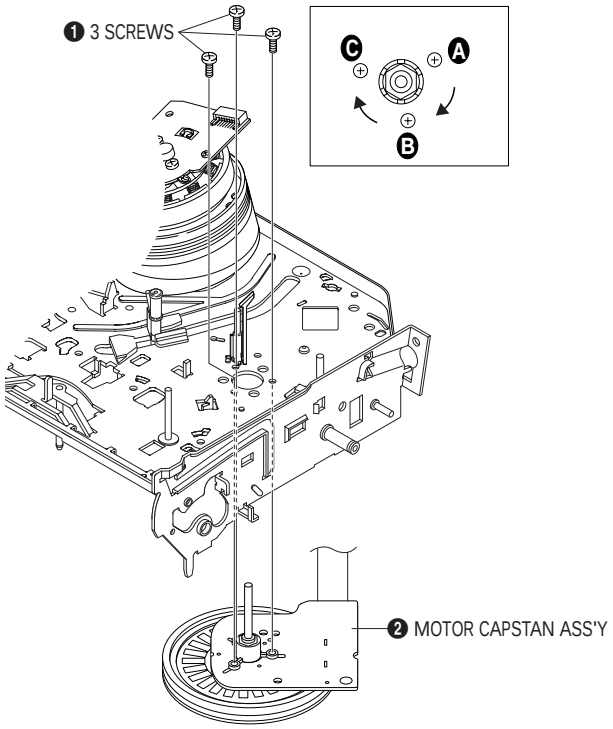


Fig. 5-40 Motor Capstan Ass'y Removal

5-4-28 Post #8 Guide Ass'y Removal

1) Rotate the Post #8 Guide Ass'y ❶ in the direction of arrow to lift up.

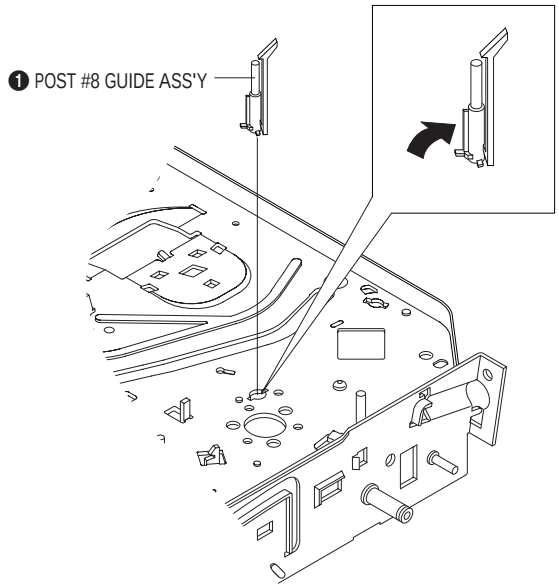


Fig. 5-41 Post #8 Guide Ass'y Removal

5-4-29 Level Head Cleaner Ass'y Removal (Optional)

1) Release the Hook ❶.
2) Lift the Lever Head Cleaner Ass'y ❷.

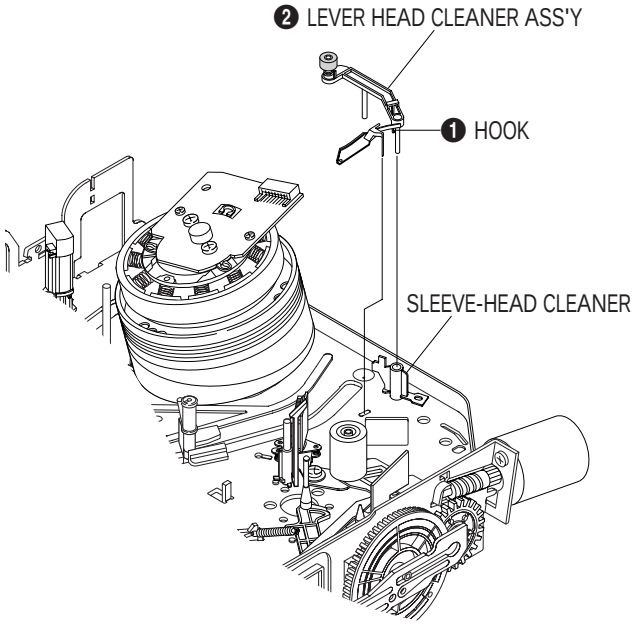


Fig. 5-42 Lever Head Cleaner Ass'y Removal

5-4-30 How to Eject the Cassette Tape (If the tape is stuck in the unit)

1) Turn the Gear worm ❶ clockwise with screw driver.(Refer to arrow)
(Other method : Remove the Screw of Motor Load Ass'y, Separate the Motor Load Ass'y)

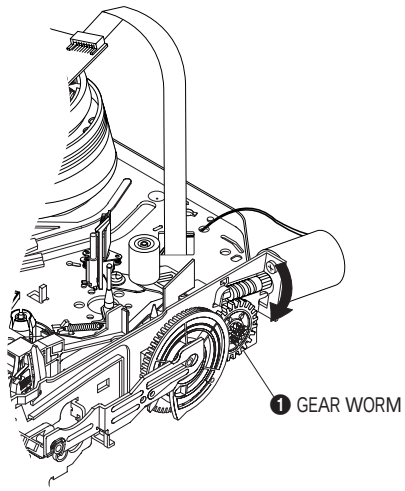


Fig. 5-43

2) When Slider S,T are approched in the position of unloading, rotate holder Clutch counterclockwise after inserting screw driver in the hole of frame's bottom in order to wind the unwinded tape. (Refer to Fig.5-43)
(If you rotate Gear Worm ❶ continuously when tape is in state of unwinding, you may cause a tape contamination by grease and tape damage. Be sure to wind the unwinded tape in the state of set horizontly.)
3) Rotate Gear Worm ❶ clockwise using screw driver again up to the state of eject mode and then pick out the tape.(Refer to Fig.5-42)

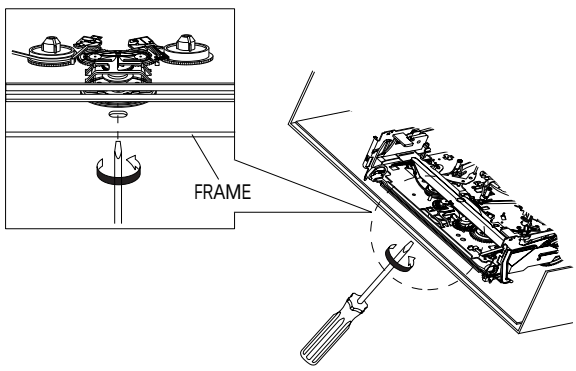


Fig. 5-44

5-5 The table of cleaning, Lubrication and replacement time about principal parts

1) The replacement time of parts is not life of parts.
2) The table 5-1 is that the VCR Set is in normal condition (normal temperature, normal humidity).
   The checking period may be changed owing to the condition of use, runtime and environmental conditions.
3) Life of the Cylinder Ass'y is depend on the condition of use.
4) See exploded view for location of each parts.

<Table 5-1>

*	Parts Name	Checking Period										Remark
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
TAPE PATH SYSTEM	POST TENSION	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	- To clean the parts, use patch and alcohol (solvent). - After cleaning, use the video tape after alcohol is gone away completely. - We recommend to use oil [EP-50] or solvent. - One or two drops of oil should be applied after cleaning with alcohol.
	SLANT POST S, T	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	#8 GUIDE SHAFT	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	CAPSTAN SHAFT	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	#9 GUIDE POST	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	#3 GUIDE POST	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
	GUIDE ROLLER S, T	Δ	Δ	Δ	O	O	O	O	O	O	O	
	CYLINDER ASS'Y	Δ	O	O	O	O	O	O	O	O	O	
	FE HEAD	Δ	Δ	Δ	O	O	O	O	O	O	O	
	ACE HEAD	Δ	O	O	O	O	O	O	O	O	O	
	PINCH ROLLER	Δ	O	O	O	O	O	O	O	O	O	
	POST REEL S, T		◆		◆		◆		◆		◆	- Periodic time of applying oil (Apply oil after cleaning) - The excessive applying oil may be the cause of malfunction.
	SLEEVE TENSION		◆		◆		◆		◆		◆	
	POST CENTER		◆		◆		◆		◆		◆	
	LEVER IDLE BOSS (2Point)		◆		◆		◆		◆		◆	
DRIVING SYSTEM	CAPSTAN MOTOR PULLEY	Δ	Δ	Δ	Δ	Δ	O	O	O	O	O	
	BELT PULLEY				O	O	O	O	O	O	O	
	HOLDER CLUTCH ASS'Y	Δ	O	O	O	O	O	O	O	O	O	
	GEAR CENTER ASS'Y		O	O	O	O	O	O	O	O	O	
	GEAR IDLE (2Point)		O	O	O	O	O	O	O	O	O	
	LOADING MOTOR		O	O	O	O	O	O	O	O	O	
BRAKE SYSTEM	BAND BRAKE ASS'Y		O	O	O	O	O	O	O	O	O	
	BRAKE T ASS'Y		O	O	O	O	O	O	O	O	O	

Δ : Cleaning O : Check and replacement in necessary ◆ : Add Oil

5-6 DVD Deck

5-6-1 Holder Chuck Removal

1) Push 4 Hooks ❶ in the direction of arrow "A" and lift up the Holder Chuck ❷.

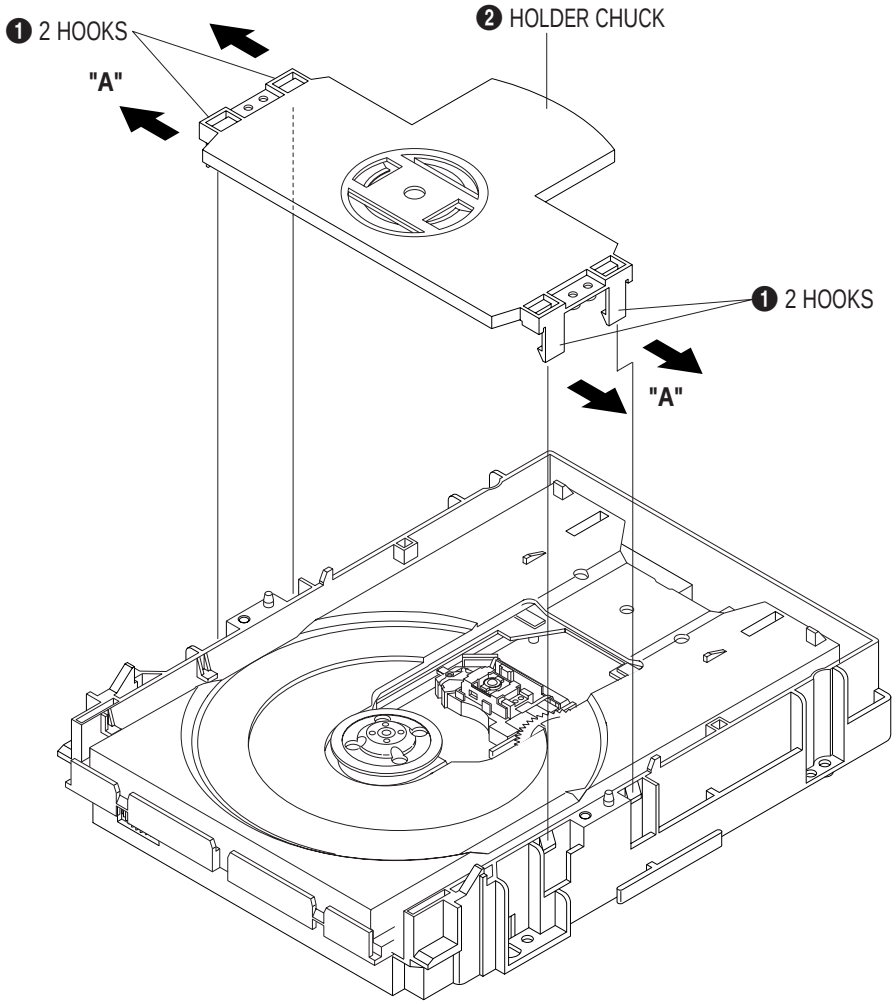


Fig. 5-45 Holder Chuck Removal

5-6-2 Tray Disc Removal

1) Insert a Screw Driver ❶ into Emergency Hole ❷ and push the Slider Housing ❸ in the direction arrow “A”.
2) When the Tray Disc ❹ comes out a little, pull it in the direction arrow “B” by hand.

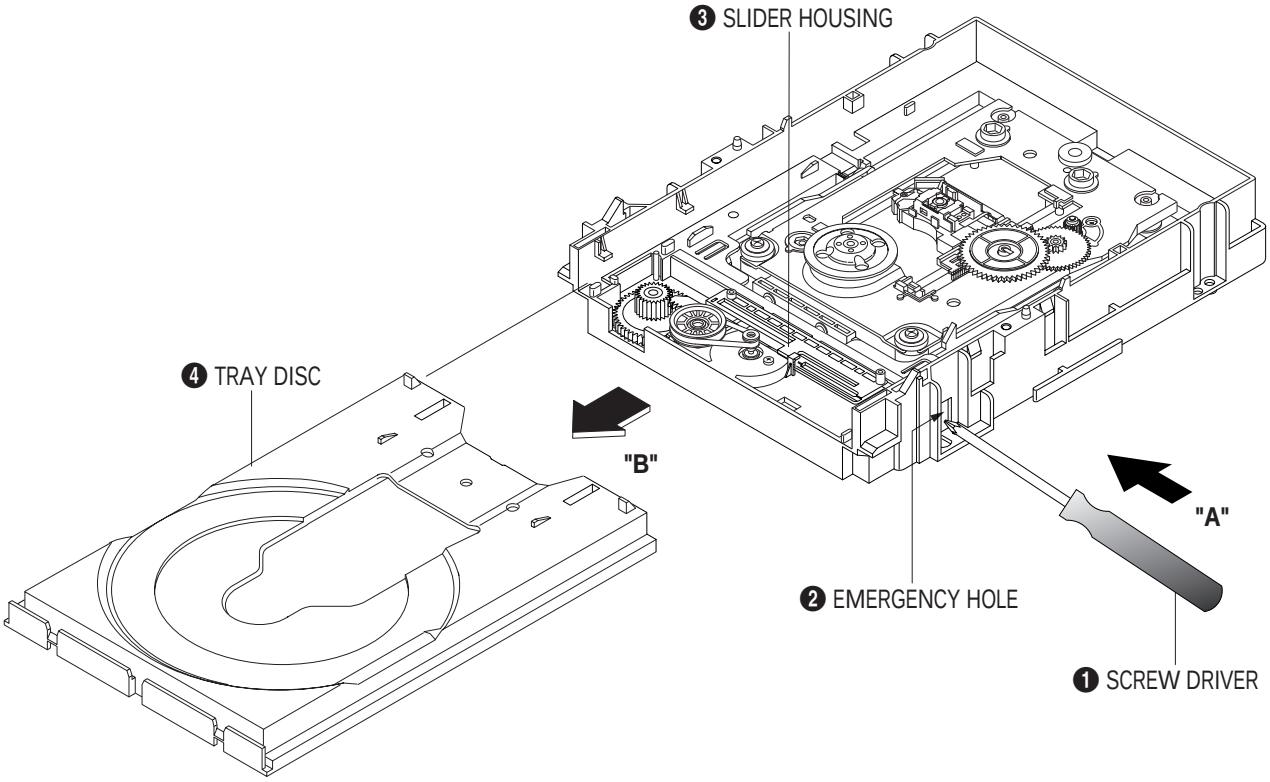


Fig. 5-46 Tray Disc Removal

5-6-3 Assy P/U Deck Removal

1) Remove the 4 Soldering ❶ (SL+, SL-, SP+, SP-).
2) Remove the 1 Screw ❷ and lift up the Ass'y P/U Deck ❸ in the direction arrow "A".
3) When the Ass'y P/U Deck ❸ lift up a little, push Chassis Sub in the direction of arrow "B" and lift up the Ass'y P/U Deck ❸.

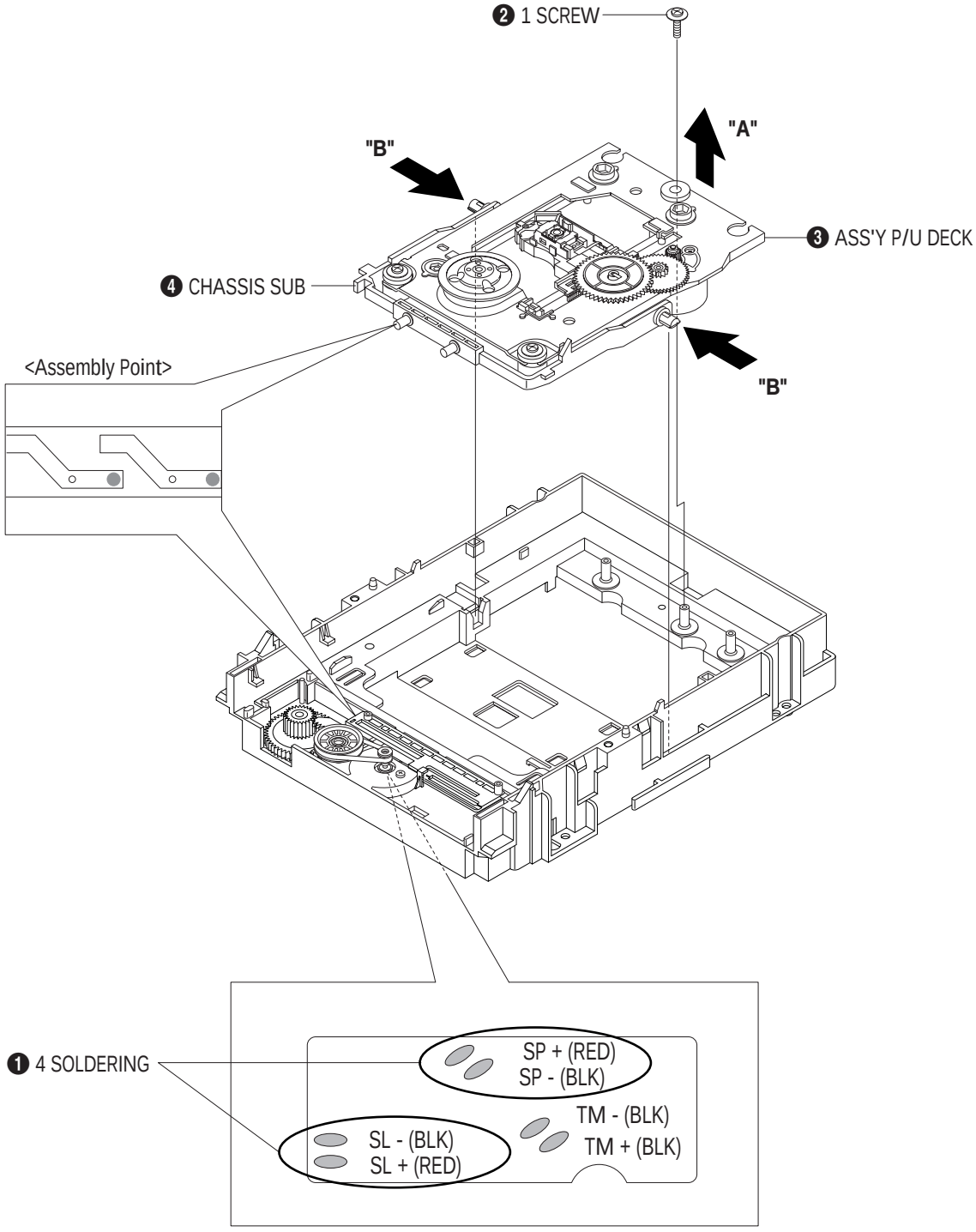


Fig. 5-47 Assy P/U Deck Removal

5-6-4 Ass'y Housing Removal

1) Remove the 2 Soldering ❶. (TM+, TM-)
2) Push the 2 Hooks ❷ in the direction of arrow "A" and remove Ass'y PCB Deck ❸.
3) Push the Slider Housing ❹ in the direction arrow "B".
4) Push the 1 Hook ❺ in the direction of arrow "C" and lift up the Slider Housing ❹.
5) Remove the Belt Pulley ❻ and 2 Screws ❼, Ass'y Motor Load ❽.
6) Push the 1 Hook ❾ in the direction of arrow "D" and lift up the Gear Pulley ❿, Gear Tray ⓫.

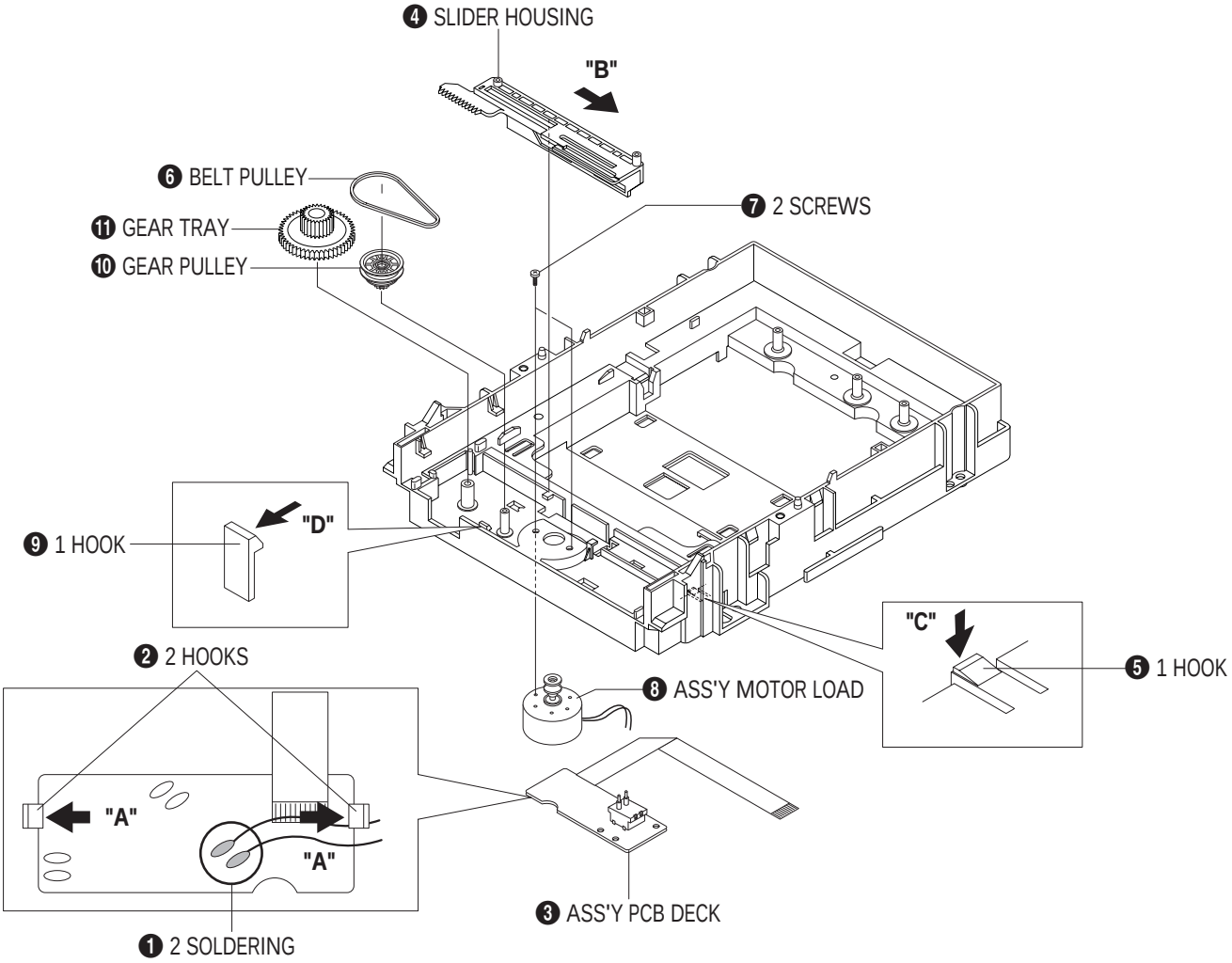


Fig. 5-48 Ass'y Housing Removal

5-6-5 Ass'y Bracket Deck Removal

1) Remove the 2 Screws ❶ and lift down Chassis Sub ❷.
2) Push the Hook ❸ in the direction of arrow "A" and lift up the Gear Feed B ❹, Gear Feed A ❺.
3) Remove the 2 Screws ❻ and lift down Motor Feed Ass'y ❼.
4) Remove the 2 Screws ❽ and lift down Motor Spindl Ass'y ❾.
5) Remove the 3 Screws ❿ and remove 3 Holder Cam Skew ⓫, Shaft Pick Up ⓬, Ass'y Pick Up ⓭.

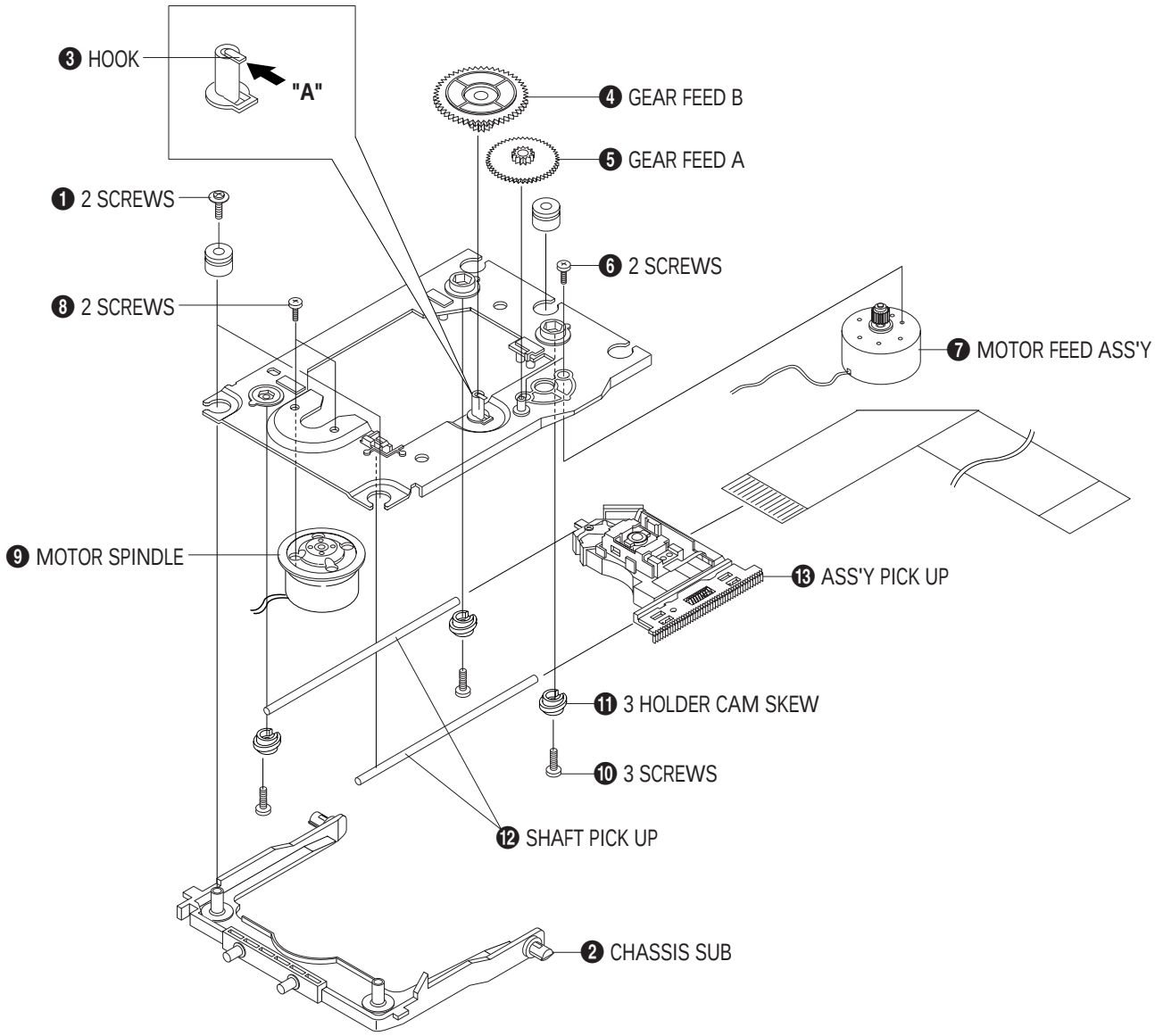


Fig. 5-49 Ass'y Bracket Deck Removal

6. Alignment and Adjustments

6-1 VCR Adjustment

6-1-1 Reference

1) X-Point (Tracking center) adjustment, “Head switching adjustment” and “NVRAM option setting” can be adjusted with remote control.
2) When replacing the Main PCB Micom (IC601) and NVRAM (IC605 ; EEPROM) be sure to adjust the “Head switching adjustment” and “NVRAM option setting”.
3) When replacing the cylinder ass’y, be sure to adjust the “X-Point” and “Head switching adjustment”.
4) How to adjust.
   - Press the “TEST” botton on VCR MAIN PCB to set the adjustment mode.
   - If the corresponding adjustment button is pressed, the adjustment is performed automatically.
   - When the adjustment is completed, be sure to turn the power off.

6-1-1(a) Location of adjustment button of remote control

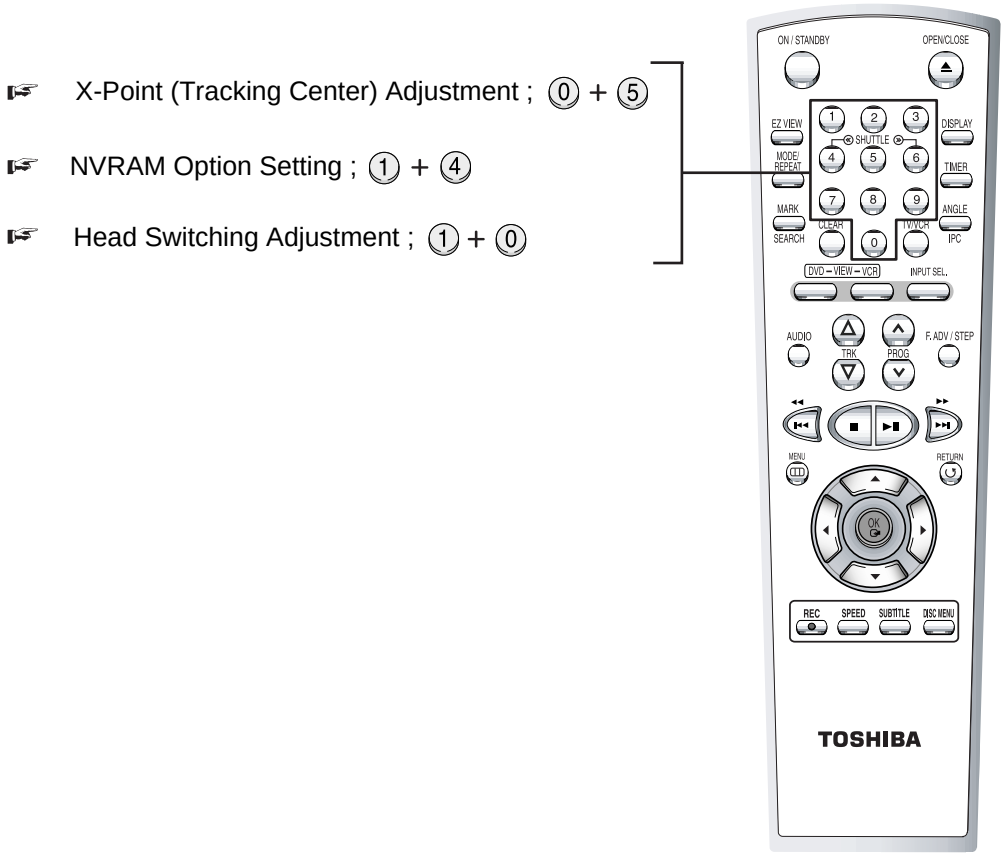


Fig. 6-1

6-1-1(b) TEST location for adjustment mode setting

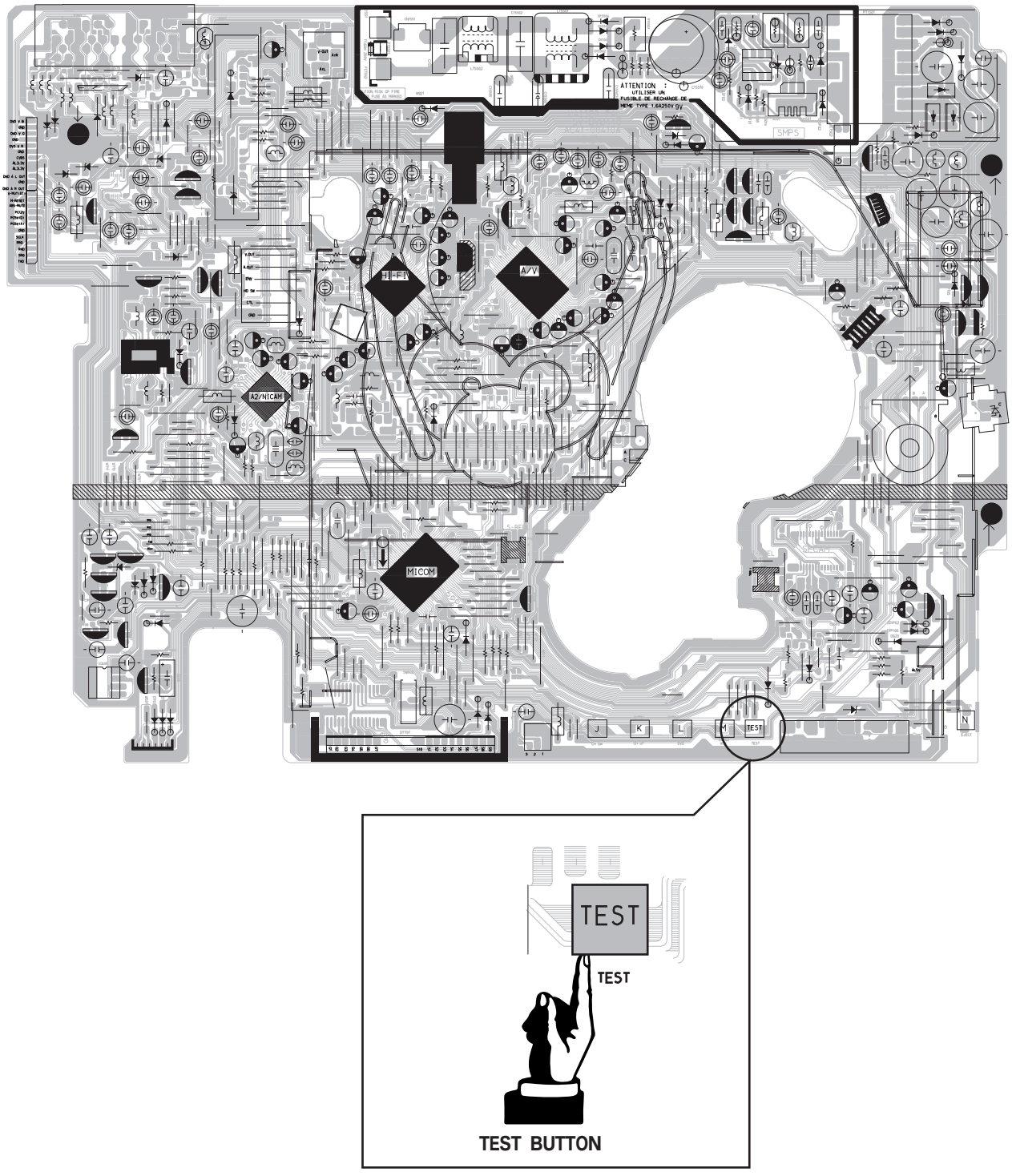


Fig. 6-2 VCR Main PCB (Top View)

6-1-2 Head Switching Point Adjustment

1) Playback the alignment tape.
2) Press the "TEST" botton on VCR MAIN PCB to set the adjustment mode. (See Fig. 6-2)
3) Press the "1, 0" buttons; remote control adjustment operates automatically. (See Fig. 6-1)

6-1-3 NVRAM Option Setting

1) NVRAM Option is adjusted in the factory.
2) In case Main PCB Micom (IC601) and NVRAM (IC605 ; EEPROM) are replaced, be sure to set the corresponding option number of the required model. (If the option is not set, the unit will not operate.)

1) Press the "TEST" botton on VCR MAIN PCB to set the adjustment mode. (See Fig. 6-2)
2) Press the "1, 4" button on the remote control. The option setting appears. (See Fig. 6-3)
3) Select the option number (See table 6-1) of corresponding model with "◀, ▶, ▲, ▼" buttons on the remote control.
4) After selecting the option number is completed, press the "▲" button of remote control. (If "▲" button is pressed, the selected number is changescolor. ; See Fig. 6-4)
5) Press the "ENTER" button of remote control again to store the option number.
6) Turn the Power off.

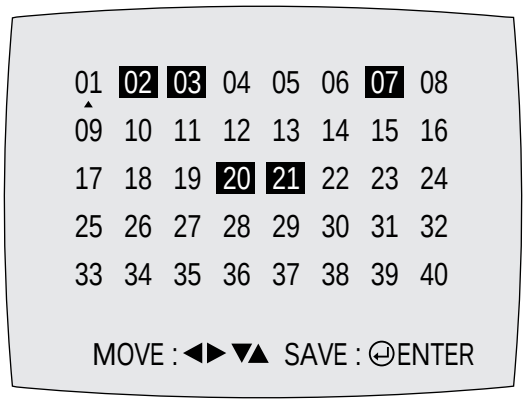


Fig. 6-3

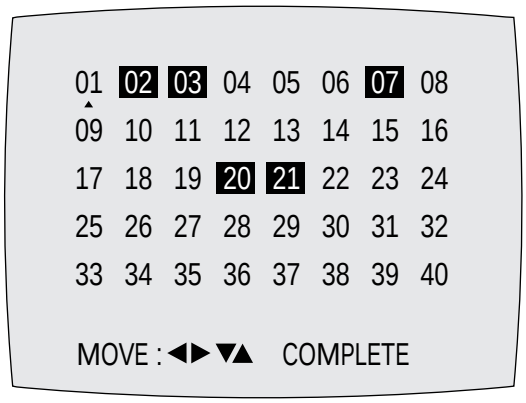


Fig. 6-4

<Table 6-1 NVRAM Option Table>

MODEL	OPTION NUMBERS
SD-14VB	4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 27, 34, 38, 40, 41, 47, 48, 49, 50, 52, 61, 63, 65, 69, 72
SD-25VE	4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 20, 21, 26, 33, 34, 35, 36, 38, 40, 47, 48, 49, 50, 52, 61, 63, 65, 69, 72
SD-25VL	4, 5, 6, 7, 9, 10, 11, 12, 13, 15, 16, 17, 34, 36, 38, 40, 42, 47, 48, 49, 50, 52, 61, 63, 65, 69, 72

6-2 DVD Adjustment

6-2-1 Location of Test Point

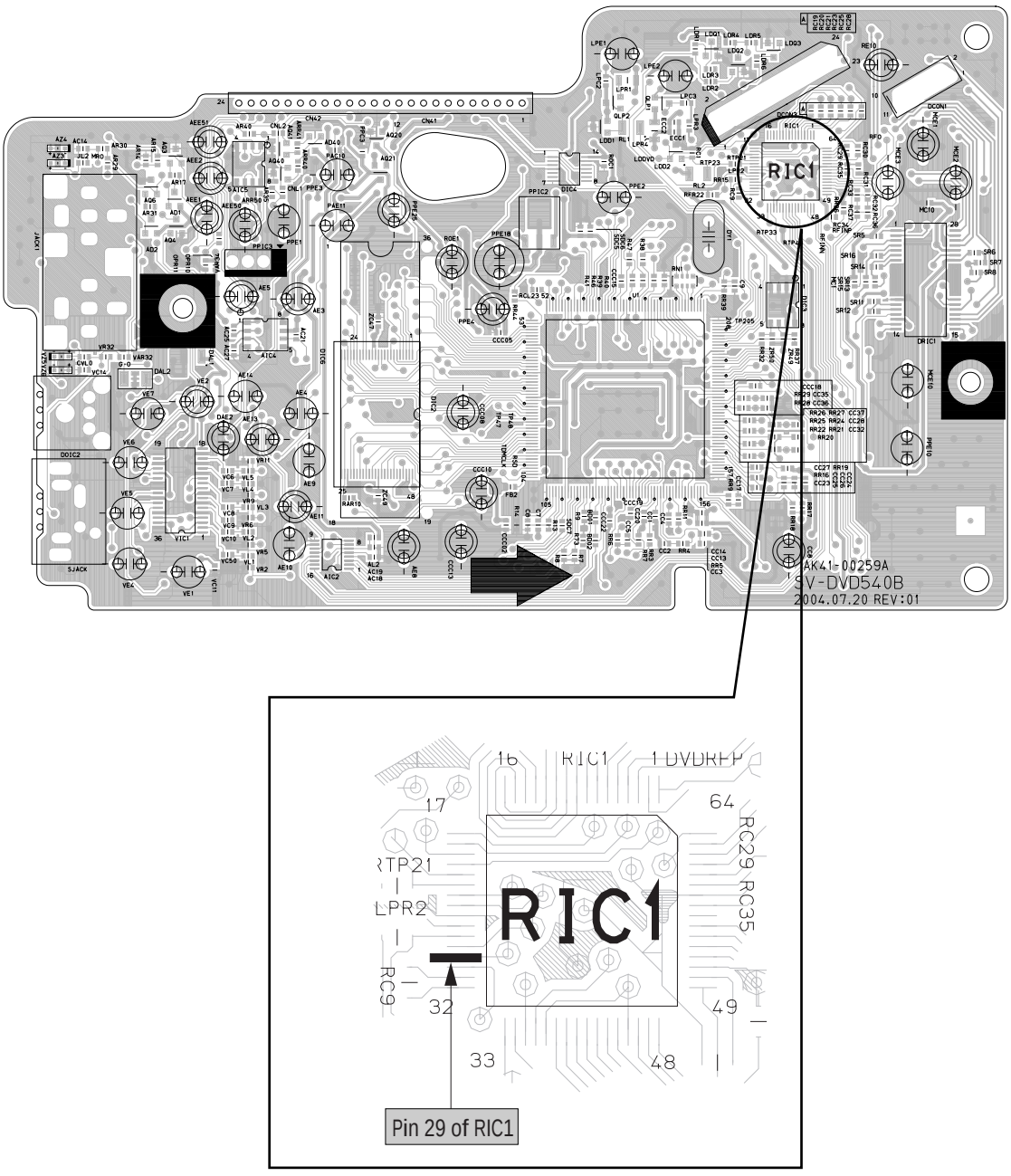


Fig. 6-5 Location of test Point (Main PCB - Top Side)

6-2-2 Screw Adjustment

6-2-2(a) Adjustment Spec. and Test Point

<Table 6-2>

◆ Test Disc ; Service not Available

Test Disc	Adjustment Spec.	Test Point	Adjustment Location
TDV-533 Chapter 14	Flat Waveform	"Pin 29 of RIC1" (DVD Main PCB - Top Side) (See Fig. 6-5)	Ass'y Deck - Top Side (See Fig. 6-6)

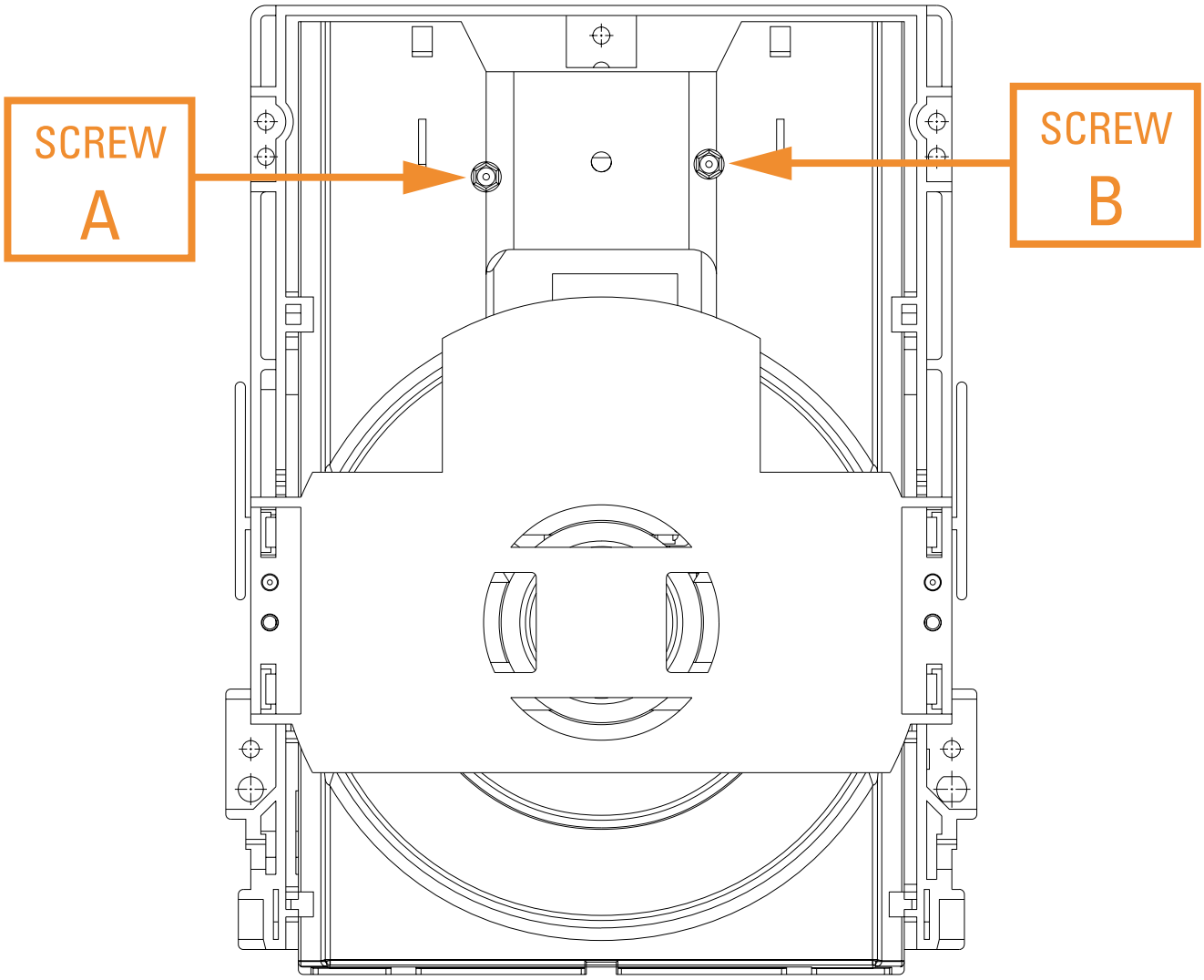


Fig. 6-6 Ass'y Deck (Top Side)

6-2-2(b) SCREW Adjustment Method

Needed to minimize the variations in Skew of the Pickup unit and to provide optimum match with the recorded signal on the Disc.

1) Connect an Oscilloscope to the “Pin 29 of RIC1” Test Point (See Fig. 6-5).
2) Connect Power, Open the Tray and Play Ch.14 Which is in the TDV-533 Disc.
   ◆ Set the Oscilloscope Range as follows :
   (Voltage ; 50mV / Div., Frequency ; 10m Sec.)
3) Adjust the Screws “A” and “B” (See Fig. 6-6) using a Hex screwdriver until you obtain a Flat Waveform and the picture is stable.
   Then, go to Chapter 1 and make sure the Waveform is Flat here as well.
   If not, you have to go back to Chapter 14 and adjust again.
   If you cannot obtain a Flat waveform, then the unit is defective.

Note : The Deck must be in a horizontal position. Use both “A” and “B” screws to adjust.

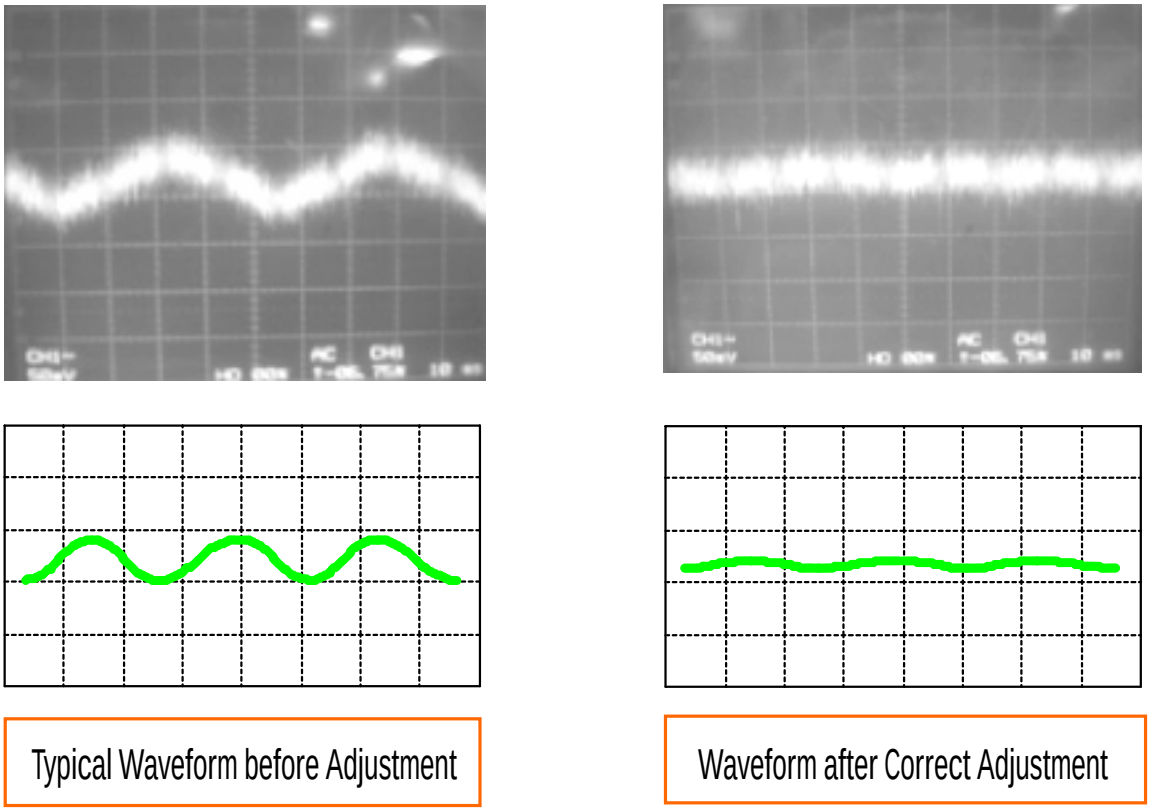


Fig. 6-7 Envelope Waveform

6-3 VCR Mechanical Adjustment

6-3-1 Tape Transport System and Adjustment Locations

The tape transport system has been adjusted precisely in the factory. Alignment is not necessary except for the following :
1) Noise observed on the screen.
2) Tape damage.
3) Parts replacement in the tape transport system.

Lower flange height of tape guide is used as the reference for the transport adjustment.
To maintain the height of the tape guide and prevent damage, do not apply excessive force onto the main base.

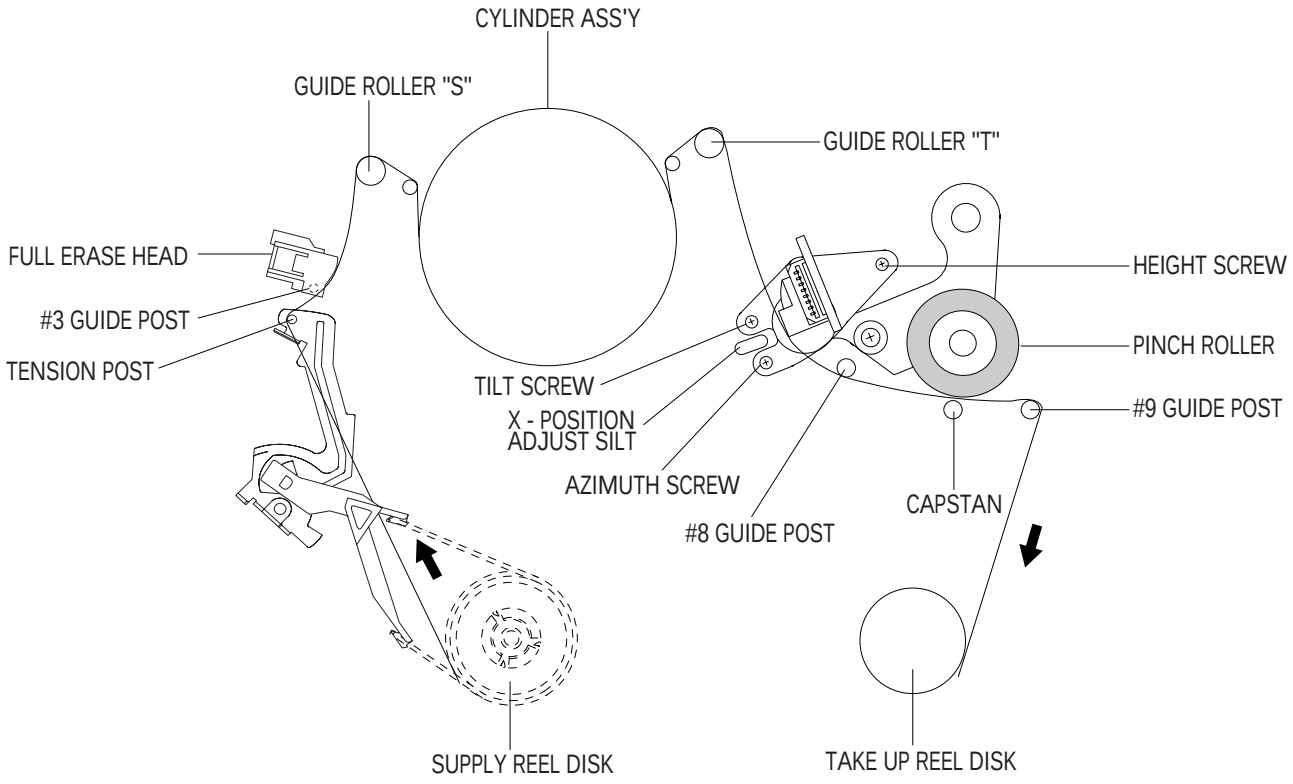


Fig. 6-8 Location of Tape Transport Adjustment

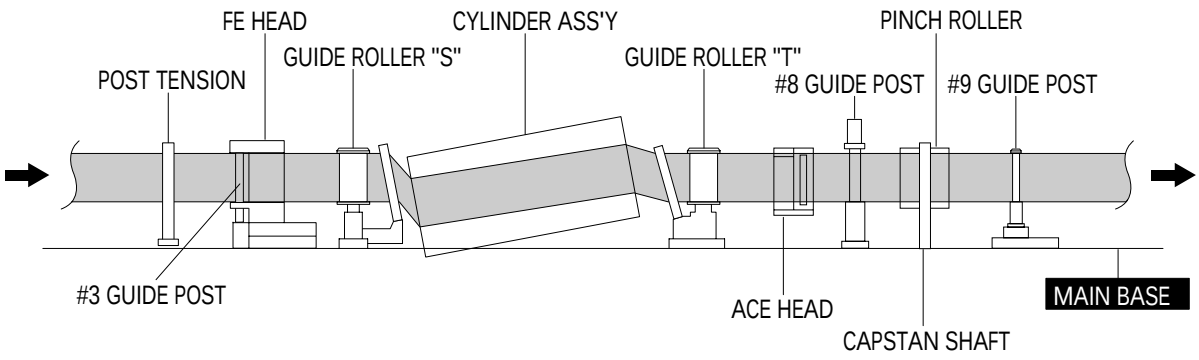


Fig. 6-9 Tape Travel Diagram

6-3-2 Tape Transport System Adjustment

When parts are replaced, perform the required adjustments by referring to procedures for the tape transport system. If there are any changes to the tape path, first run a T-120 tape and make sure excessive tape wrinkle does not occur at the tape guides.

◆ If tape wrinkle is observed at the guide roller S, T, turn the guide roller S, T until wrinkle disappears.
◆ If the tape wrinkle is still observed at the tape guide, perform the tilt adjustment of the ACE head.

(1) ACE Head Assembly Adjustment

a. ACE HEAD HEIGHT ADJUSTMENT

1) Run the alignment tape (Color bar) in the playback mode.
2) Observe surface of the audio head using a dental mirror.
3) Turn screw (C) clockwise or counterclockwise until the gap of lower tape edge and the lower edge of the control head is about 0.25mm. (Refer to Fig. 6-10 and 6-11)

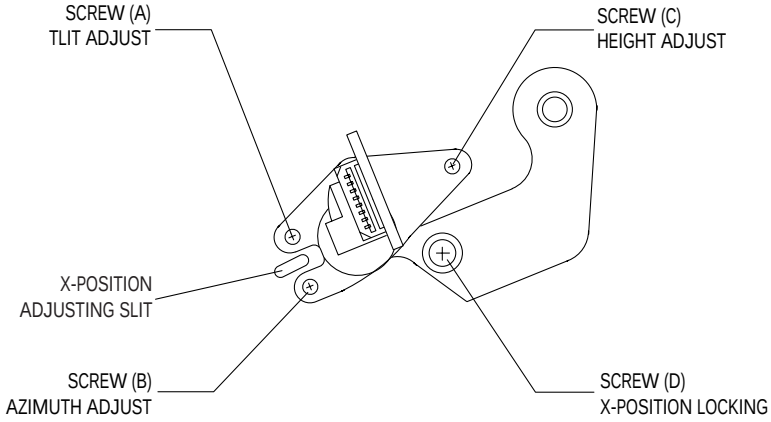


Fig. 6-10 Location of ACE Head Adjustment Screw

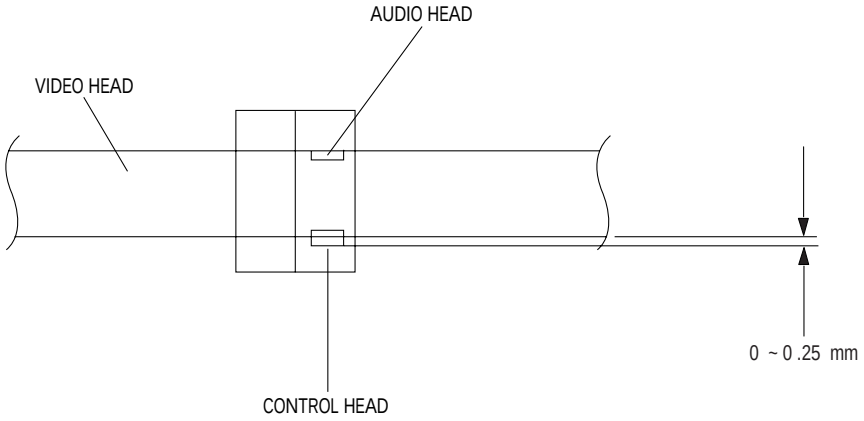


Fig. 6-11 ACE Head Height Adjustment

b. ACE HEAD TILT ADJUSTMENT

1) Playback a blank tape and observe the position of the tape at the lower flange of tape guide.
2) Confirm that there is no curl or wrinkle at the lower flange of tape guide as shown in Fig. 6-12 (B).
3) If a curl or wrinkle of the tape occurs, slightly turn the screw (A) tilt adjust on the ACE head ass'y.
4) Reconfirm the ACE head height.

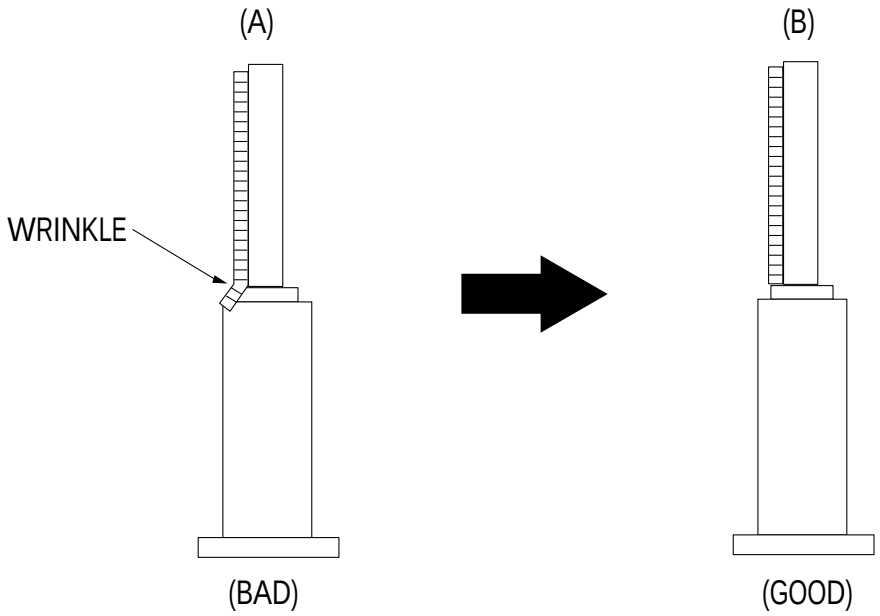


Fig. 6-12 Tape Guide Check

c. AUDIO AZIMUTH ADJUSTMENT

1) Load alignment tape (Mono scope) and playback the 7KHz signal.
2) Connect channel-1 scope probe to audio output.
3) Adjust screw (B) to achieve maximum audio level. (See Fig. 6-10)

d. ACE HEAD POSITION (X-POINT) ADJUSTMENT

1) Playback the alignment tape (Color bar)
2) Press the “TEST” botton on VCR MAIN PCB to set the adjustment mode. (See Fig. 6-2)
3) Press the “0, 5” remote control buttons, then adjustment is operates automatically. (See Fig. 6-1)
4) Connect the CH-1 probe to “Envelope” the CH-2 probe to “H’D switching pulse” and then trigger to CH-1.
5) Insert the (-) driver into the X-Point adjustment hole and adjust it so that envelope waveform is maximum.

Test point :	W325 (Audio Output)
	W324 (Envelope)
	W323 (H’D S/W -Trigger)
	W322 (Control Pulse)

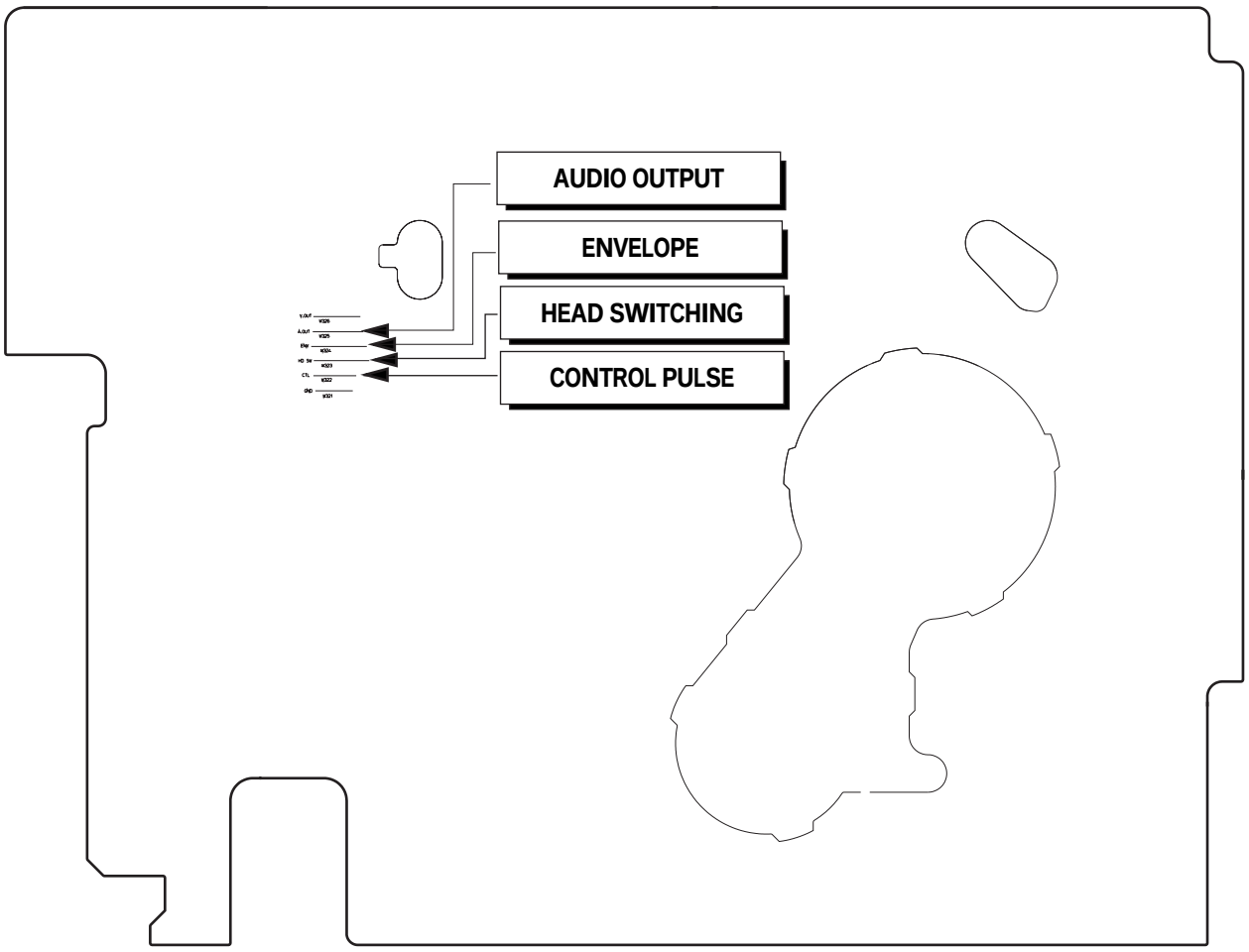


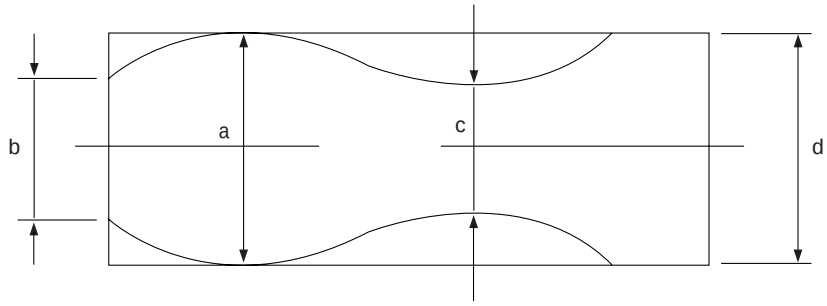
Fig. 6-13 Location of Test point (VCR Main PCB-Top View)

(2) Linearity adjustment (Guide roller S, T adjustment)

1) Playback the Mono Scope alignment tape (SP mode).
2) Observe the video envelope signal on an oscilloscope (triggered by the video switching pulse).
3) Make sure the video envelope waveform (at its minimum) meets the specification shown in Fig. 6-14.
   If it does not, adjust as follows :

Note :
a=Maximum output of the video RF envelope.
b=Minimum output of the video RF envelope at the entrance side.
c=Minimum output of the video RF envelope at the center point.
d=Maximum output of the video RF envelope at the exit side.

4) If the section A in Fig. 6-15 does not meet the specification, adjust the guide roller S up or down.
5) If the section B in Fig. 6-15 does not meet the specification, adjust the guide roller T up or down.



a b c d

c,b,d/a ≧ 63%

Fig. 6-14 Envelope Waveform Adjustment

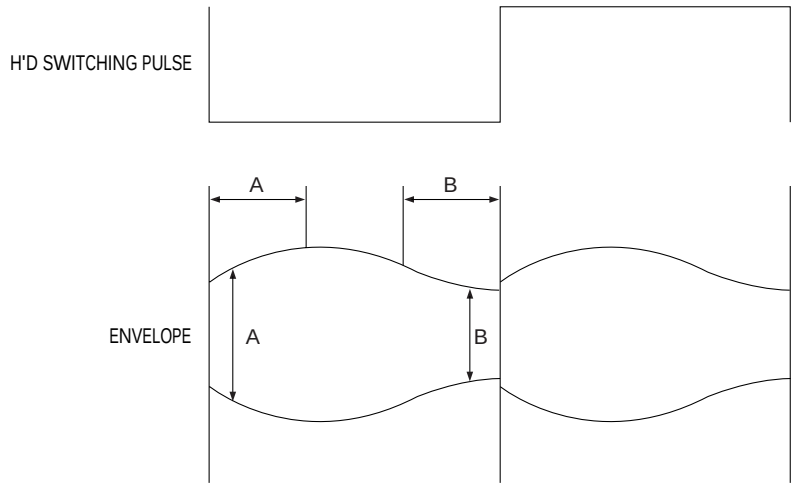


Fig. 6-15 Adjustment Points

6) Play back the Mono Scope alignment tape (SP mode).
7) Connect an oscilloscope CH-1 to the “Envelope” and CH-2 to the “H’D SW Pulse” for triggering.
8) Turn the guide roller heads with a flat head ( ) driver to obtain a flat video RF envelope as shown in Fig. 6-16.

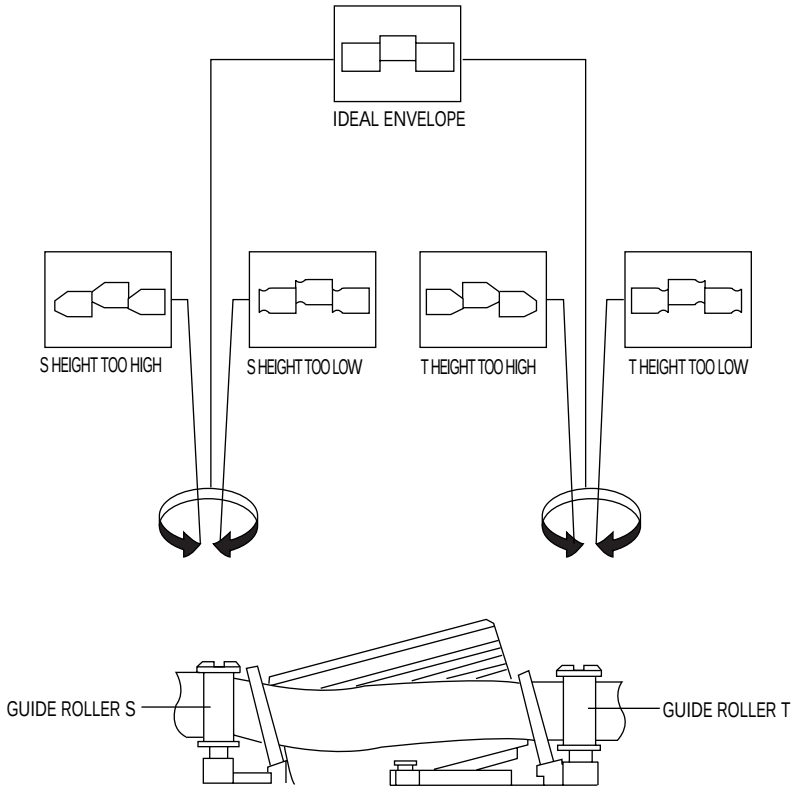


Fig. 6-16 Guide Roller S, T Height Adjustment

(3) Check Transitional Operation from RPS to Play

Check transition from RPS mode to play mode : Using a pre-recorded SP tape, make sure the entry side of envelope comes to an appropriate steady state within 3 seconds (as shown in Fig. 6-17).
If the envelope waveform does not reach specified peak-to peak amplitude within 3 seconds, adjust as follows :

1) Make sure there is no gap between the supply roller lower flange and the tape.
   If there is a gap, adjust the supply guide roller again.
2) Change operation mode from the RPS to the play mode (again) and make sure the entry side of envelope rises within 3 seconds.

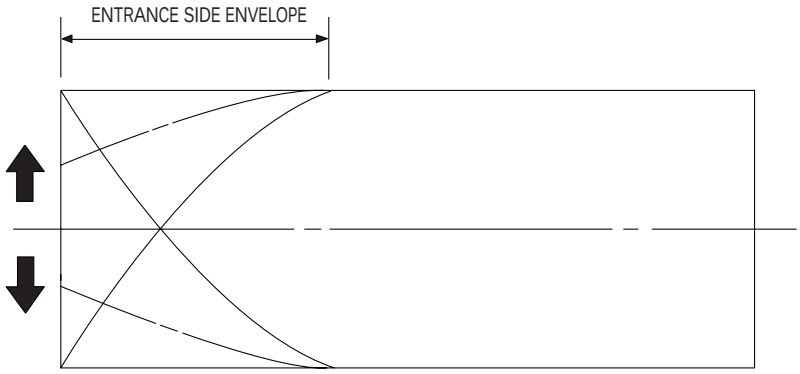


Fig. 6-17 Video Envelope Rising when Operation mode Changes from RPS to Play Mode

(4) Envelope Check

1) Make recordings on T-120 (E-120) and T-160 (E-180) tape.
   Make sure the playback output envelope meets the specification as shown in Fig. 6-18.
2) Play back a self recorded tape (recording made on the unit using with T-120 (E-120).
   The video envelope should meet the specification as shown in Fig. 6-18.
   In SP mode, (A) should equal (B).
   If the head gap is wide, upper cylinder should be checked.

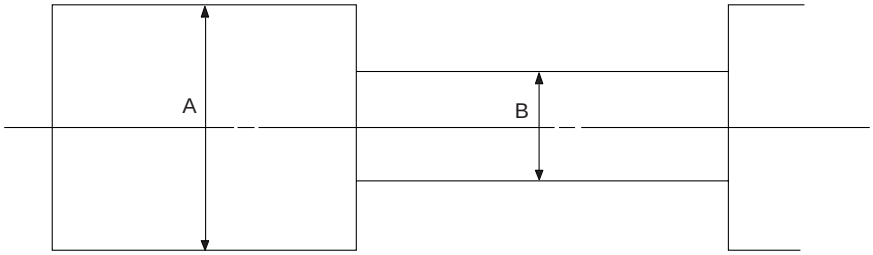


Fig. 6-18 Envelope Input and Output Level

(5) Tape Wrinkle Check

1) Run the T-160 (E-180) tape in the playback, FPS, RPS and Pause modes and observe tape wrinkle at each guide.
2) If excessive tape wrinkle is observed, perform the following adjustments in Playback mode :

- ◆ Tape wrinkle at the guide roller S, T section : Linearity adjustment.
- ◆ Tape wrinkle at tape guide flange : ACE head assembly coarse adjustment.

6-3-3 Reel Torque

1) The rotation of the capstan motor causes the holder clutch ass'y to rotate through the belt pulley.
2) The spring wrap PLAY/REV of holder clutch ass'y drives the disk reel S, T through gear idler by rotation of gear center ass'y.
3) Brake is operated by slider cam at FF/REW mode.
4) Transportation of accurate driving force is done by gears. (Gear Center Ass'y)

Note : If the spec. does not meet the followings specifications, replace the holder clutch ass'y and then recheck.

<Table 6-4>

MODE	TORQUE g/cm	GAUGE
PB	42 ± 11	Cassette Torquemeter
RPS	145 ± 30	Cassette Torquemeter

7. Circuit Operating Descriptions

7-1 Power Supply (Free Voltage)

(1) Comparsion between Linear Power Supply and S.M.P.S.

(a) Linear

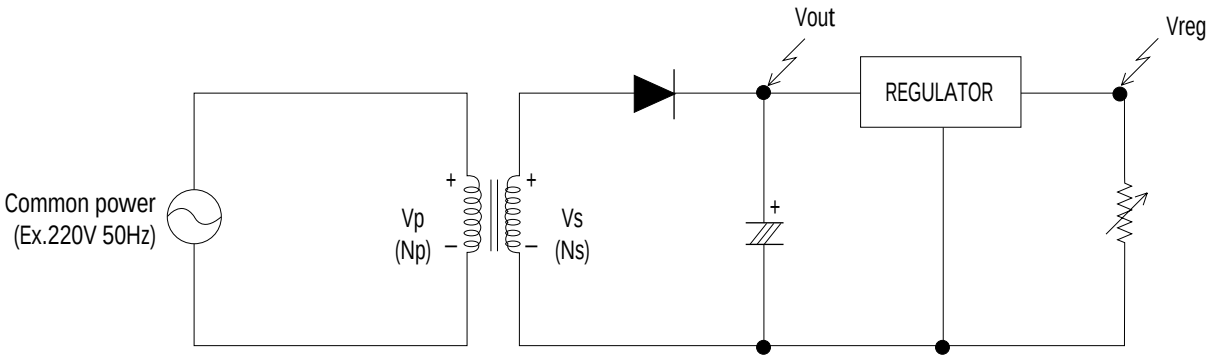


Fig. 7-1 Linear Power Supply

◆ Waveform/Description

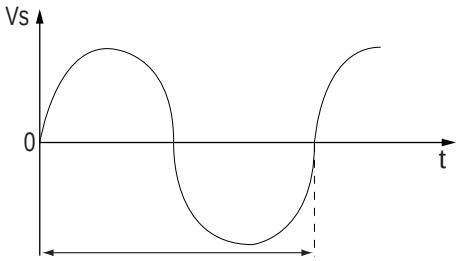


Fig. 7-2

Input : Common power to transformer (Vp).

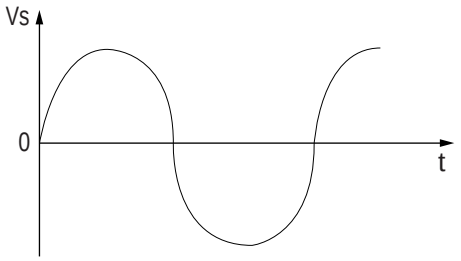


Fig. 7-3

The output Vs of transformer is determined by the ratio of 1st Np and 2nd Ns.
Vs = (Ns/Np) x Vp

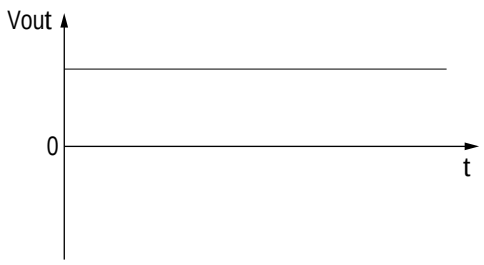


Fig. 7-4

Vout is output (DC) by diode and condensor.

◆ Advantages and disadvantages of linear power supply

1) Advantages : Little noise because the output waveform of transformer is sine wave.

2) Disadvantages :
   ❶ Additional margin is required because Vs is changed (depending on power source). (The regulator loss is caused by margin design).
   ❷ Greater core size and condensor capacity are needed, because the transformer works on a single power frequency.

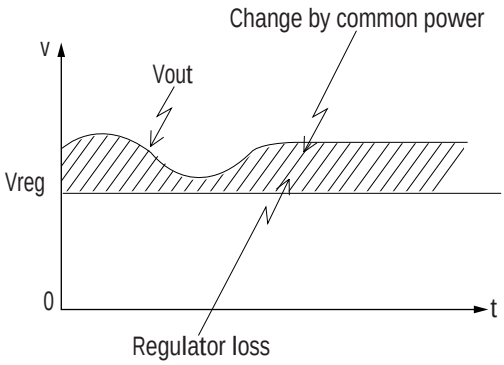


Fig. 7-5

(b) S.M.P.S. (Switch Mode Power Supply)

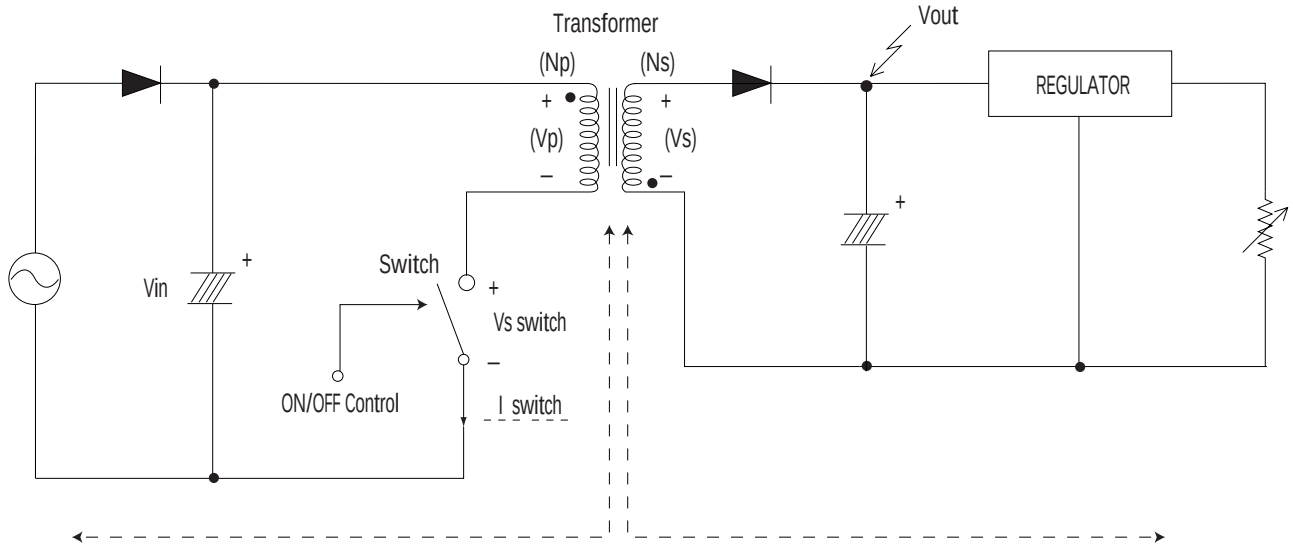


Fig. 7-6

◆ Terms

1) 1st : Common power input to 1st winding.
2) 2nd : Circuit followings output winding of transformer.
3) f (Frequency) : Switching frequency (T : Switching cycle)
4) Duty : (Ton/T) x 100

(2) Circuit description (FLY-Back PWM (Pulse Width Modulation control)

(a) AC Power Rectification/Smoothing Terminal

1) D1SS01, D1SS02, D1SS03, D1SS04 : Convert AC power to DC(Wave rectification).
2) C1SS10 : Smooth the voltage converted to DC.
3) L1SS01, L1SS02, C1SS01, C1SS02 : Noise removal at power input/output.
4) R1SS01 : Rush current limit resistance at the moment of power cord insertion.
   - Without R1SS01, the bridge diode might be damaged as the rush current increases.

(b) SNUBBER Circuit : R1SD11, R1SD13, C1SD12, C1SD16, D1SS11

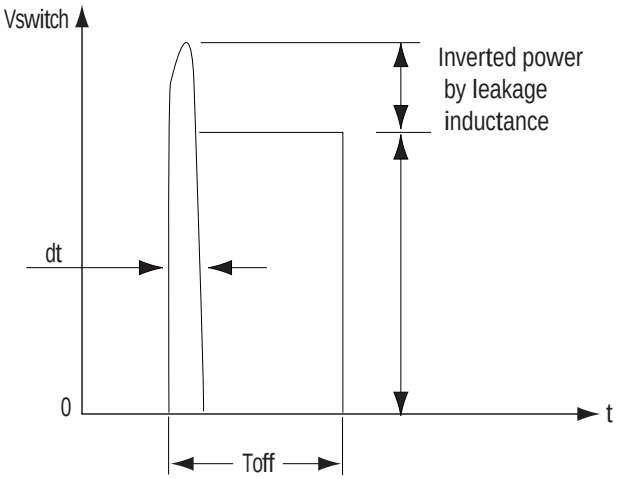


Fig. 7-7

1) Prevent residual high voltage at the terminals of switch during switch off/Suppress noise.
   High inverted power occurs at switch off, because of the 1st winding of transformer :
   (V= LI xdi/dt. LI : Leakage Induction)
   A very high residual voltage exists on both terminals of SCS11A because dt is a very short.

2) SNUBBER circuit protects SCS11A from damage through leakage voltage suppression by RC,
   (Charges the leakage voltage to D1SS11 and C1SD12 and discharges to R1SD11 and R1SD13).

3) C1SS16 : For noise removal

(c) IC1SS2 Vcc circuit

1) R1SR01, R1SR02, R1SR03 : IC1SS2 driving resistance
   (IC1SS2 works through driving resistance at power cord in)
2) IC1SF01 Vcc : R1SS08, D1SF02, C1SF02
   ❶ Use the output of transformer as Vcc, because the current starts to flow into transformer while IC1SS2 is active.
   ❷ Rectify to D1SF02 and smooth to C1SF02.
   ❸ Use the output of transformer as IC1SS2 Vcc : The loads are different before and after IC1SS2 driving.
   (Vcc of IC1SS2 decreases below OFF voltage, using only the resistrance due to load increase after IC1SS2 driving.)

(d) Feedback Control Circuit

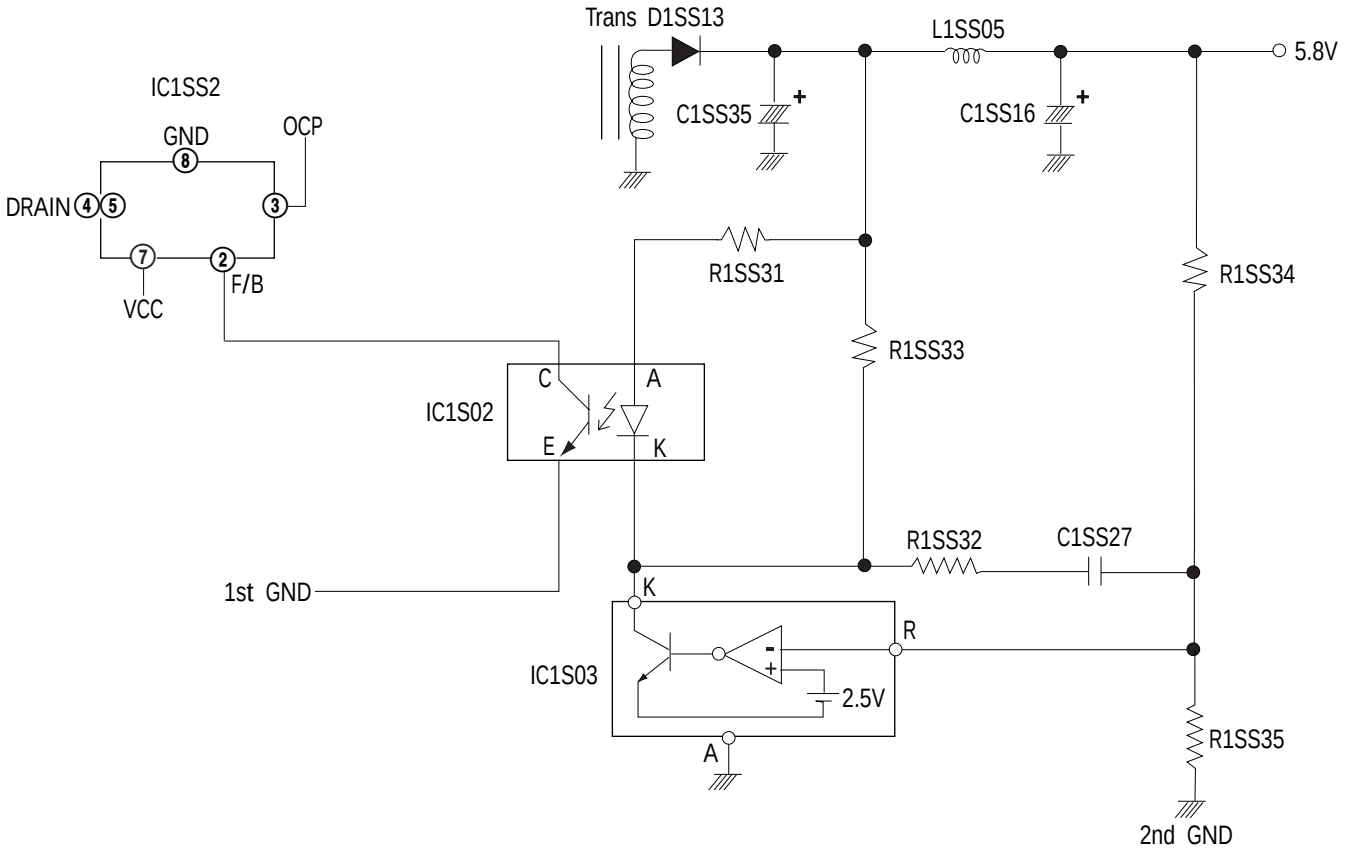


Fig. 7-8

1) F/B terminal of IC1SF01 determines output duty cycle.
2) C-E(Collector-Emitter) of IC1SF01 and F/B potential of IC1SF01 are same.

◆ Operation descriptions

1) Internal OP-Amp '+' base potential of IC1S03 is 2.5V and external "-" input potential is connected with R1SS35 and R1SS34 to maintain Vout of 5.8V. (Vout = (((R1SS34)xR1SS35) / R1SS35) x 2.5V)
2) If load of 5.8 V terminal increases(or AC input voltage decreases) and Vout decreases below 5.8V, then : IC1S03 "P" potential down below 2.5V --> IC1S03 A-K of base current down --> IC1S03 of A-K current down --> IC1S03 Diode current down --> IC1S03 C-E current down --> IC1S03 C-E voltage up --> IC1SS2 F/B voltage up --> Out Duty up --> Transformer 1st current up --> Transformer 1st power up --> Vout up --> Maintain Vout 5.8V
3) If load of 5.8 V terminal decreases(or AC input voltage rises) and Vout rises above 5.8V, then : Reverse sequence of the above description --> Duty down --> Vout down --> Maintain 5.8V (i.e., the feedback to maintains 5.8V).
   ❶ R1SS33, R1SS31 : Reduce 5.8V overshoot
   ❷ R1SS32, C1SS27 : Prevent IC1S03 oscillation(for phase correction)

(3) Internal Block Diagram

(a) Internal Block Diagram of S.M.P.S. Circuit

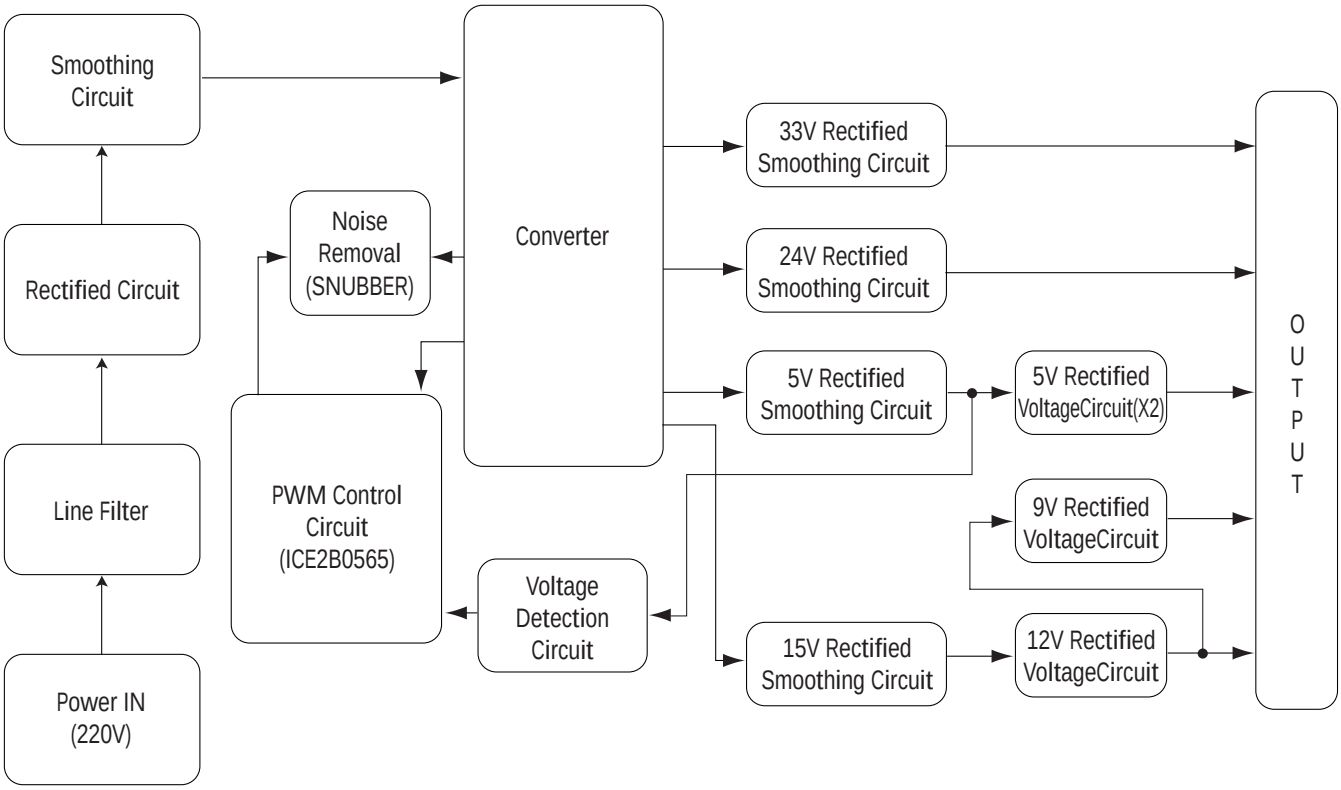


Fig. 7-9

(b) IC1SF01 (ICE2B0565) Internal Block Diagram

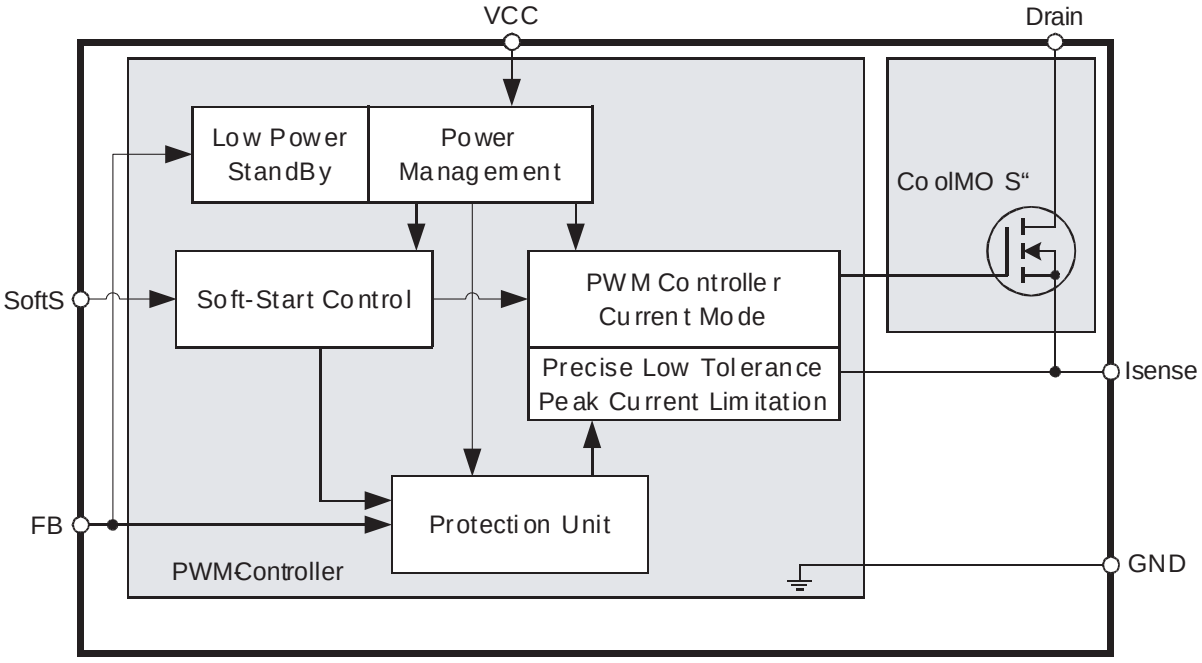


Fig. 7-10

7-2 System Control

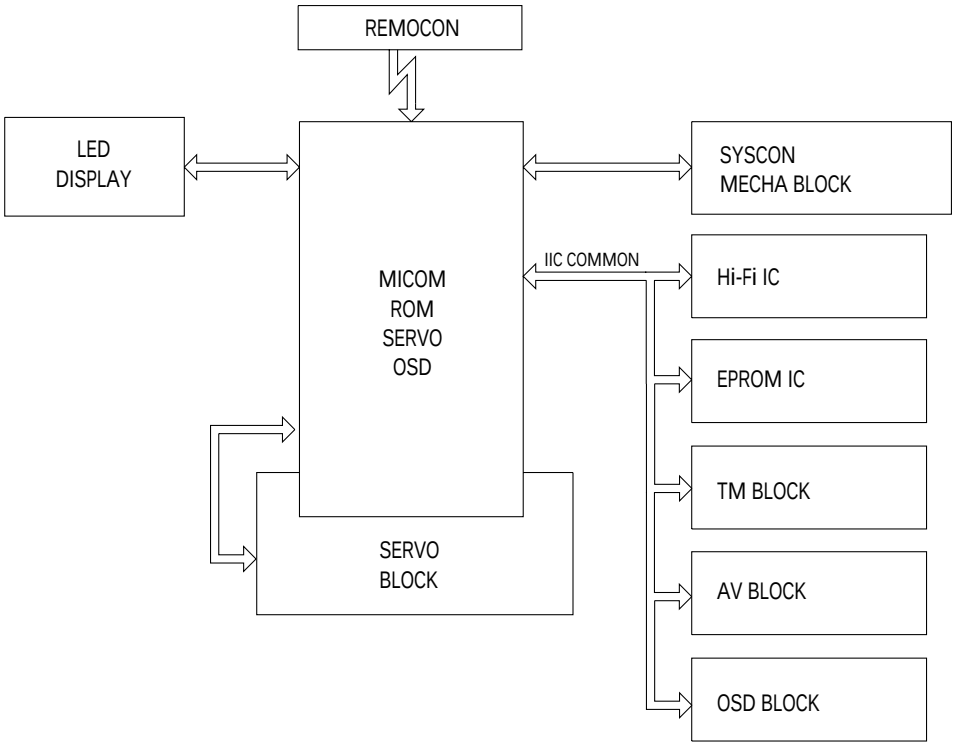


Fig. 7-11 Micom Block Diagram

(1) Outline

The system control circuit inputs the commands given by the operator to set the mechanism and circuit to the commanded mode. The circuit also inputs the detected output from the tape and mechanism protection sensor and protects the VCR and tape against abnormal operation.
Fig. 7-11 is a simplified system control block diagram.
The system control is performed by 4 control sections. (System and timer control, Servo control, F/S Tuner, On Screen Display).

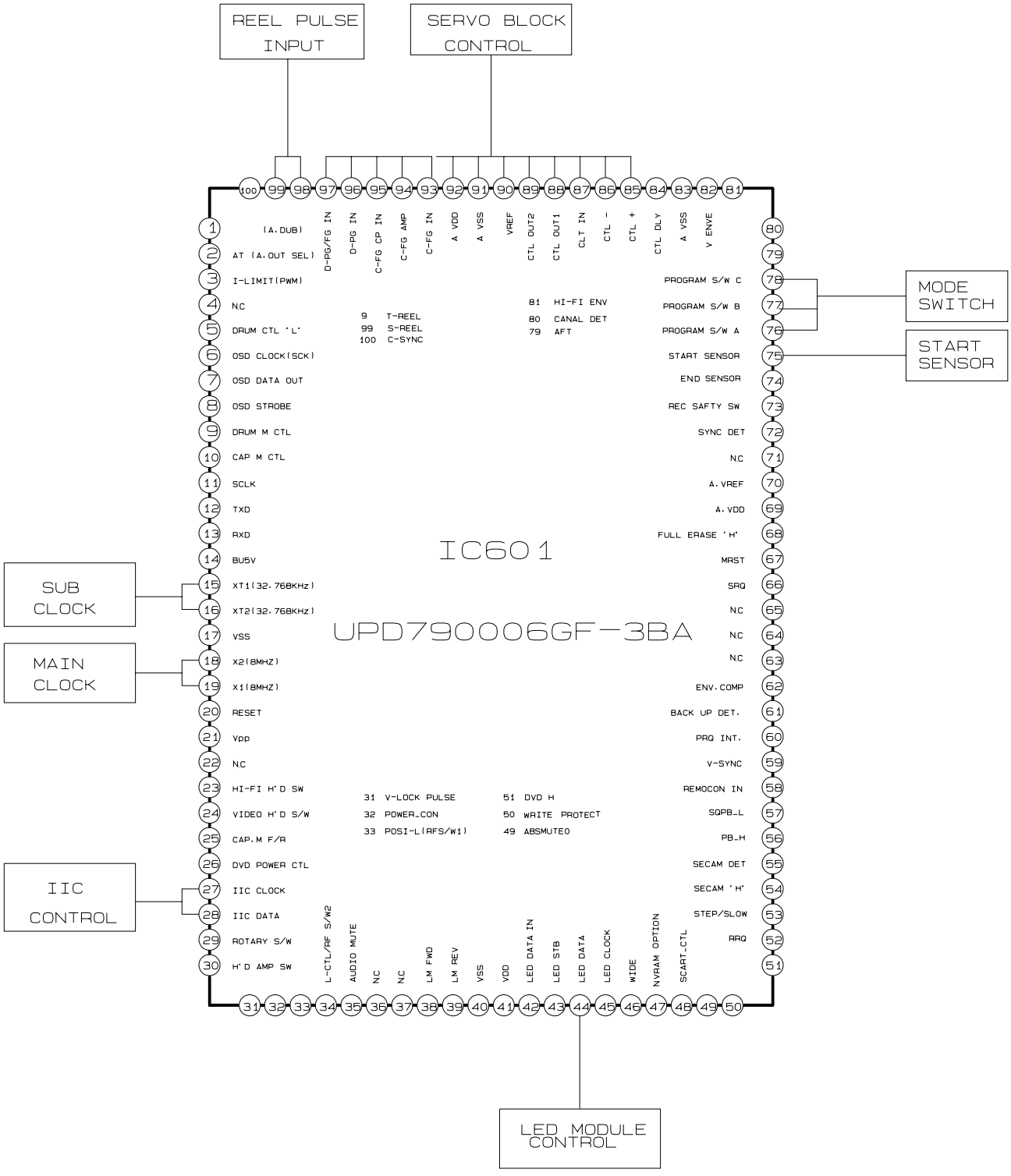


Fig. 7-12 Block Diagram

(2) Mechanism/Circuit Control

When the u-COM inputs operator's commands via the key input or remote input, the mechanism and circuits are set to the command mode. This function controls mechanism/servo section and audio/video processing section.

1) Cassette Loading Control

Controls loading and ejection of a cassette and determines the mechanism operation mode; tape loading/unloading, action/release of various breaks, tension, take up mechanism etc.

2) Tape Protection Sensor Monitoring

Detects abnormal operation in tape using the supply and take up end sensor, reel sensor and SW 25Hz pulse for drum rotation.

3) Capstan Motor Control

Determines the tape speed and direction, fast forwards and rewinds the tape etc.

4) Tape Counter Control

Counts the control pulses on the control track, picked up by the control head and shows it on the digital multidisplay.

5) Servo Control

Determines the operation mode of the servo circuit. Control the speed of drum and capstan motor, and then Control the phase of drum and capstan motor.

6) Record Safety Tap Detection

Detects the safety tab on the rear of a cassette to prevent a prerecorded program from being erased.

7) Loading/Unloading control

Controls a series of loading/unloading operation after the u-COM judges the operation mode and sets the mechanism to suitable mode. Fig. 7-13 show correlation between u-COM and peripheral components during the loading/unloading operation.
The mechanism state switch (PROG. SW) detects the mechanism position. When the driving gear is turned by the loading motor, the switch driving slider traces the groove, and this switch stops at the correct position corresponding to each mode. In other words, the u-COM judges the present mechanism state from the PROG SW after receiving the mode data, then it outputs the loading motor and capstan motor control signals.
This continues until the PROG SW reaches the correct state by the u-COM.

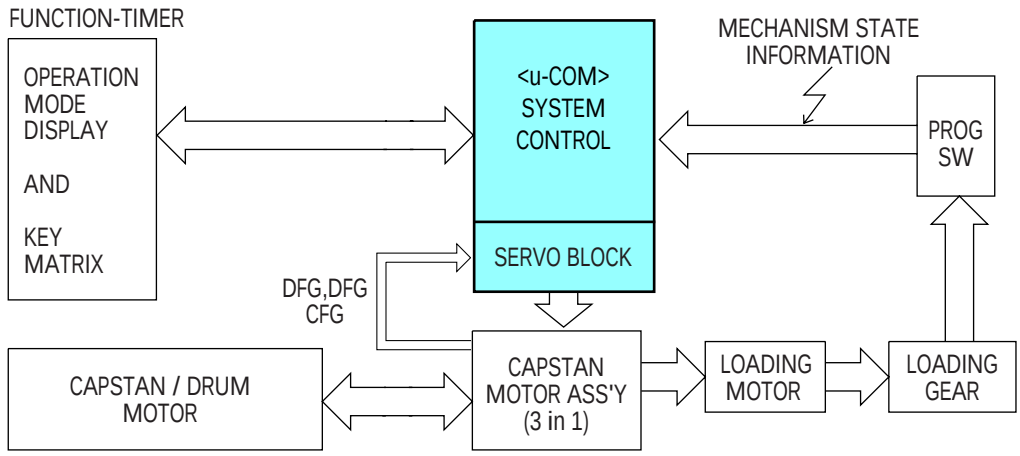


Fig. 7-13 The Relationship Between u-COM, Capstan, Cylinder and Loading Motor

(3) Program SW Input

The mechanism state for each mode is shown in table 7-1 below. The mechanism state is classified into position, and correlation between the switch position and mechanism state is shown in table 7-1, also.

Table 7-1 : Prog. SW State in Each Mode

POSION	CAM S/W			START SEN	ACTION MODE
	A	B	C		
STANBY	0	0	0	0	Eject
POWER OFF	0	0	0	1	Unload POWER OFF
LOADING START	0	0	0	1	(Tape loading start point)
LOADING END	1	0 1	1	1	(Tape loading end point)
REV	1	1	0	X	Reverse picture search, reverse SLOW
PLAY	0	1	0	X	Play, Rec, F-PS, Still, SLOW, F-ADV
STOP 1	0	0	1	1	Stop (Play position 5 Min. over)
STOP 2	0	0	1	X	(MAIN Break ON MODE)
FF/REW 1	1	0	0	X	High speed Rew, Low speed FF
FF/REW 2	0	1	1	X	High speed FF, Low speed Rew

(4) Motor Control

In case of Scorpio-2 Deck, Loading Motor Drive IC lies in Capstan Motor, not like Scorpio-1 Deck.
In detail, Capstan Motor Drive IC is designed to drive Loading Motor + Capstan Motor + Cylinder Motor in one IC.

Table 7-2 : Motor Control Logic

CN604-PIN10	MOTOR
0 ~ 1V	Reverse
2 ~ 3V	Stop
4 ~ 5V	Forward

(5) Stop Mode

The VCR enters the stop mode when the stop button is pressed during playback, record, rewind and fast forward mode. When trouble is detected, the VCR enters the stop mode to protect the tape and mechanism or when the tape reaches the end, etc.
- State Input ;
  Power switch on position.
  Stop button operation in all mode, except for timer recording and XPR.

(6) Loading/Unloading Operation

mechanism operation in loading/unloading is as described previously.
- Signal Processing ;
- Audio, video record/play ;
  Micom controls the AV1 chip by IIC line.

(7) Play Mode

- State input ; Play button operated in stop, fast forward, rewind, forward search, reverse search, still mode, etc.,
- Indication output ;
  "PLAY" lights in LED display.
- Output at ;
  IC601 Pin 25 (CAP F/R) : Hi

(8) Trick Play Mode

Trick play modes are classified into forward search, reverse search, still, slow and frame advance.
Audio signal is muted. V-lock is controlled by pin 31 of IC601.

(9) Forward Search Mode

5 Times play speed search in SP.
- State input ; Press the fast forward button on the VCR front panel or the remote control in play or still mode.
- Indication output ; First digit rotates in LED display.
- Output at ;
  IC601 Pin 25 (CAP F/R) : Hi

(10) Reverse Search Mode

5 times play speed reverse search in SP.
- State input ; Press the rewind button on the VCR front panel or on the remote control in play or still mode.
- Indication output ; First digit rotates in LED display.
- Output;
  IC601 Pin 25 (CAP F/R) : Low

(11) Slow Mode

- State input ; Press the still button and next press the FF button on the remote control.
- Indication output ; First digit rotates in LED display.
- Output at ;
  IC601 Pin 25 (CAP F/R) : Hi

(12) Frame Advance Mode

Views one stop-action "frame" after another.
- State input ; Press the F.ADV/STEP button on the remote control in still mode.
- Indication output ; Counter blinks in LED display.
- Output at ;
  IC601 Pin 25 (CAP F/R) : Hi

(13) Play/Still Mode

The same track is traced by the video heads.
- State input ; Press the ⏯ button in play and search modes.
- Indication output ; Counter blinks in LED display.
- Output at ;
  IC601 Pin 25 (CAP F/R) : Hi

(14) Record Mode

Must use a cassette with the safety tab.
Index signal is recorded on the control track of the tape at the start of recording.
- State input ;
  Press the record button during stop mode and record pause mode or at the preset time reached in the timer record mode. Press the REC button in stop mode.
- Indication output ; "R" lights in LED display in normal record mode.
- Output at ;
  IC601 Pin 25 (CAP F/R) : Hi

(15) Record Pause Mode

The pinch roller is released from the capstan shaft in a moment. The brake is applied to the take up reel to prevent tape slack during the record pause mode.
- State input ; Press the pause button in the record mode.

Note : Inoperative during recording and XPR mode.

- Indication output ; "R" blinks in LED display.

(16) Fast Forward Mode

Tape fast forward operation using capstan motor.
- State input ; Press the rewind button in the stop or fast forward modes.
- Indication output ; First digit rotates in LED display.
- Output at ;
  IC601 Pin 25 (CAP F/R) : Hi

(17) Rewind Mode

Tape rewind operation using the capstan motor.
- State input ; Press the rewind button in the stop or fast forward modes.
- Indication output ; First digit rotates in LED display.
- Output at ;
  IC601 Pin 25 (CAP F/R) : Low

(18) Rewind Shut-Off Mode

Tape rewind operation then power off mode.
- State input ; Press the power button in the rewind mode.

(19) VISS (VHS Index Search System)

- Index search ;
  Find a certain point of the tape using high speed REW/FF and start playback. (Fig. 7-14). The detection is obtained by adjusting the width of the control pulse. (duty cycle) When recording starts, the duty cycle of control pulse will change and then record on the control track of the tape for 2 seconds.

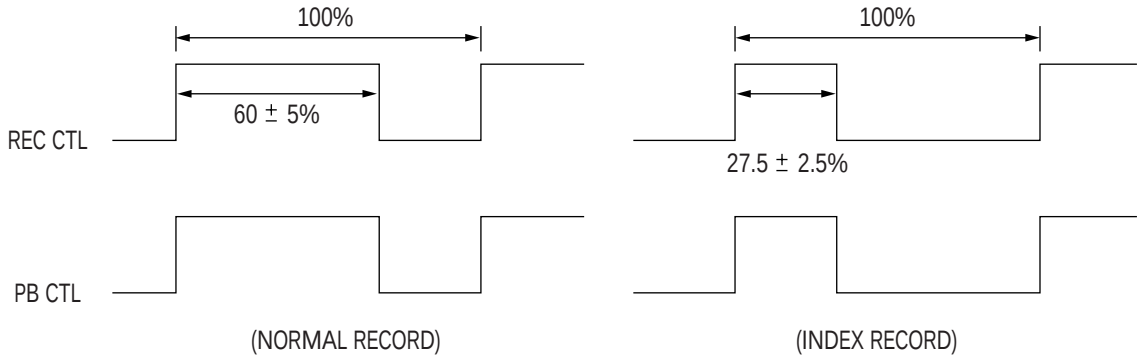


Fig. 7-14 Index Recording

- Index Detection Process
  The detector block in IC601 detects the duty cycle of the control pulse input at Pin 85, 86.
  When detecting the index mark, the Micom controls the next operation such as scan play.

- Intro Scan
  Continues FF or REW then playback at the index mark point for about 5 seconds and repeats the operation the end of the tape or the start sensor is detected during intro forward scan or intro reverse scan.

(20) Trouble Detection

The trouble detection circuits are provided to protect the from damage (Fig. 7-15). The reel lock sensor detects incorrect rotation of supply and take up reel. The reel lock sensor consists of the disk and photo sensor installed at the bottom of the reel disk. the disk has 6 or 8 shielder parts and the photo sensor consists of the LED and photo transistor assembly. When the light is shielded by the the shielder or enters the photo transistor, the output is obtained from the photo sensor. IC601 measures the period of the pulse. When it is 4 seconds or more during record/play, the VCR enters the reel emergency mode.
The VCR maintains the unload-power-on state in the reel emergency.

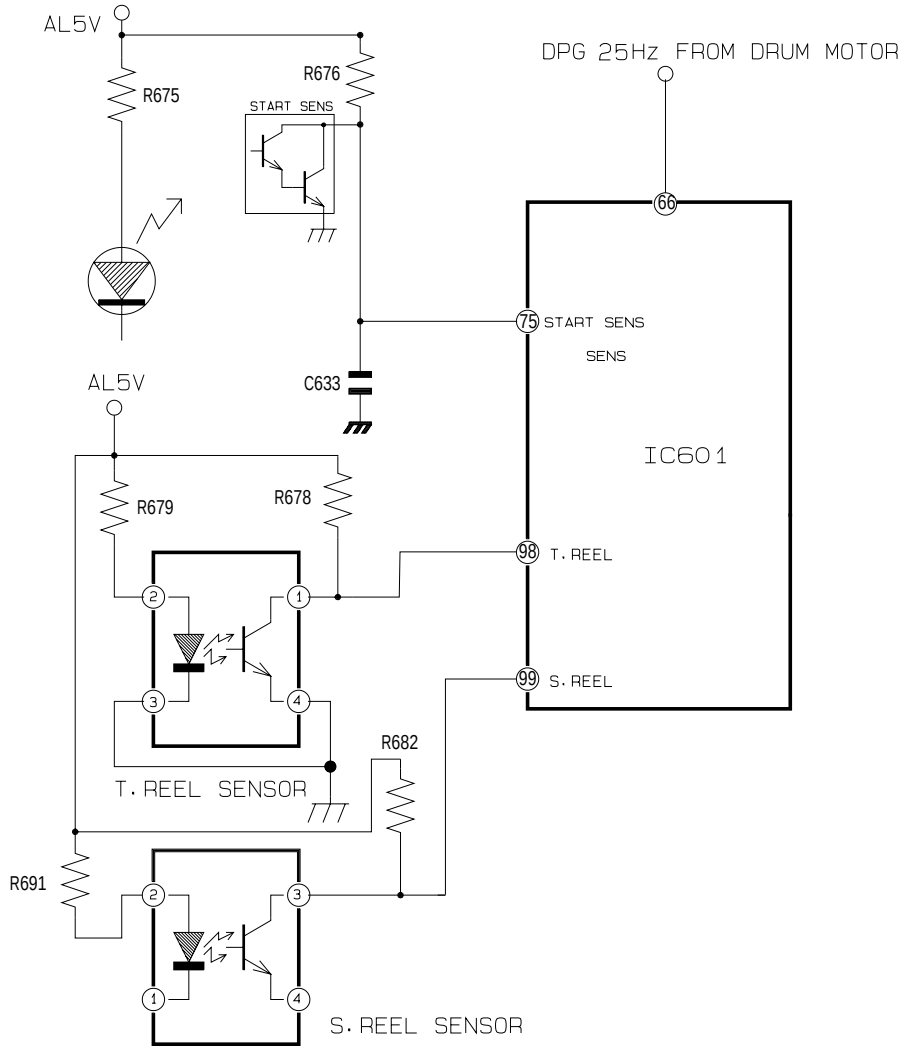


Fig. 7-15 Reel and Cylinder Lock T.END/S.END Sensor

(21) Cylinder Lock Sensor

Cylinder lock sensor detects abnormal rotation of the cylinder motor. Cylinder FG pulse is supplied to pin97 of IC601. MICOM measures the period of the pulse in the play/record, search and trick play models. When H'd S/W frequency is less than 10Hz for 5 seconds, the VCR enters the stop mode.

(22) Tape End Detection

When supply end sensor detects the transparent section at the end of tape, the VCR enters auto rewind mode, except during timer recording and OTR mode. The cassstte LED emits light through the transparent section of tape to the photo transistors, which are installed at both ends of the cassette. When take up end sensor detects the start section of the tape during reverse search and rewind, the VCR automatically goes to stop mode.

(23) Tape Counter Control

Fig. 7-16 is a simplified diagram of the tape counter control circuit. The tape counter in the u-COM counts the control pulses derived from control head. The control signal on the control track of the tape is picked up by the control head and supplied to pins 85, 86 of IC601. The control pulse is amplified by the u-COM IC. The u-COM determines the tape direction so the counter counts up when the "CAP F/R"signal is Hi and the counter counts down when the "CAP F/R" signal is Low. By counting the control pulse, the counter data is supplied to the VF display. Counter displays the time and it is increased or decreased by one minute after counting 1500 control pulses. Counter mode is switched to clock mode when the display button is pushed or when the VCR goes to power off mode. When the reset button is pressed, the counter is reset to "00 : 00".
The tape counter has a memory stop function.

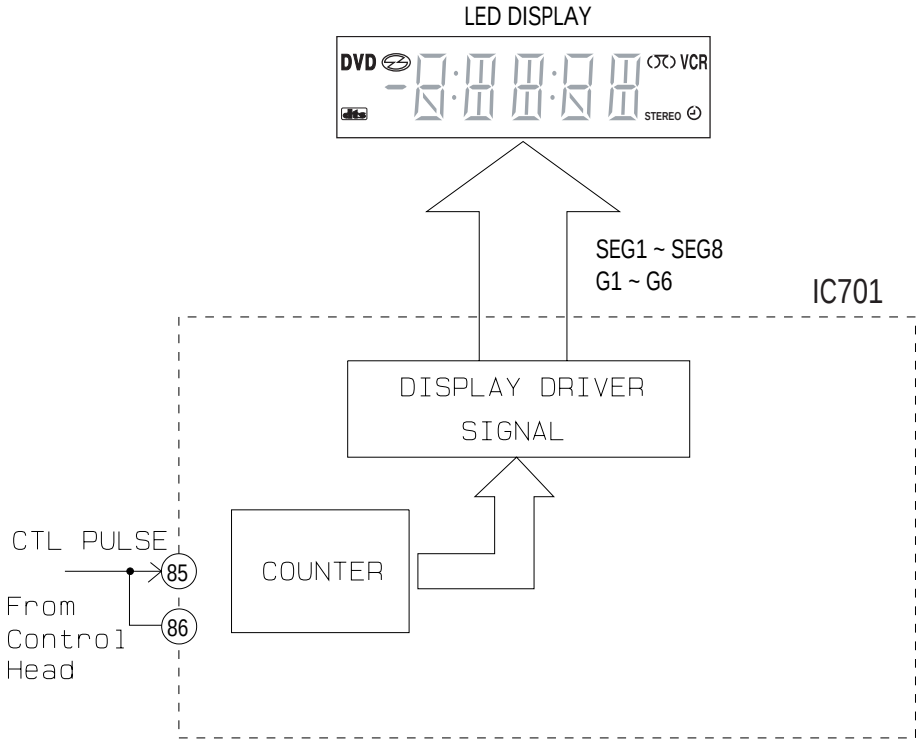


Fig. 7-16 Counter Display

(24) Timer/OTR Control

The timer can preset 6 programs in one year including daily and weekly programs.
Express recording lets the operator record up to 9 hours without programming the timer.

(25) Clock Display

The clock generator inside of the u-COM counts the oscillation signal of XT601 for the timer clock data.

(26) Power Failure Detection

u-COM goes to the power failure mode when the 61 port is lower than 4/5 of AD Vcc level.

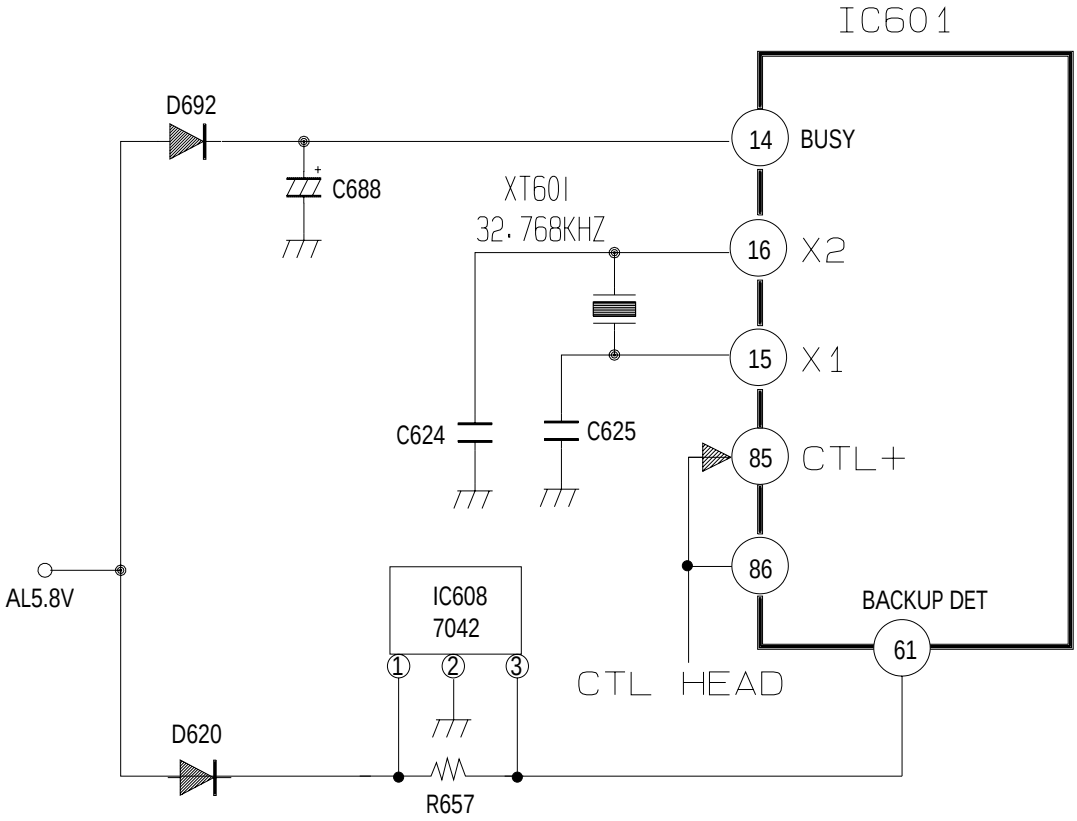


Fig. 7-17 Clock Control and Power Failure Detection

(27) 4H'D Control

During trick play (Still, Slow, F-Advance), it is necessary to control pre-amp, Video circuit.
The Micom control pin 29 (C-ROTARY), pin 30 (HD-AMP) of the IC601 during PB period in Slow mode.
These port is applied to Video IC to operate the trick play.

7-3 Servo

(1) Outline

The servo system is divided into three loops. The cylinder servo controls the rotation of video heads, the capstan servo controls the tape speed, and the tension. In addition it's necessary to control cylinder motor, especially during trick play in 4H'D models. The tension servo maintains the tape tension constant: it keeps the compression strength of tape against the video heads at the optimum level so that a stable RF signal is produced during recording and playback. The tension servo operation is entirely mechanical. The cylinder servo loop controls the phase and speed of the cylinder motor. The speed is kept at a constant 1500 RPM and the phase determines the mechanical position relative to the vertical Sync signal. The capstan servo loop controls the phase and speed of the capstan motor so that the video head can trace the video track correctly.
It keeps tape speed constant according to the mode (SP, LP)during playback and recording.

Table 7-3 : Servo System Signal

MOTOR	SYSTEM	MODE	REFERENCE SIGNAL	COMPARISON SIGNAL
CYLINDER (VIDEO HEAD) (4H' D)	PHASE	REC	V-SYNC	SW 25Hz
		PB	REF25Hz	
	SPEED	COMMON	8MHz	CYLINDER FG(500Hz)
	SPEED& PHASE	TRICK PLAY (STILL. SLOW)	MICOM CONTROL CYLINDER SPEED TO MATCH H-SYNC SPEED	
CAPSTAN (4H' D)	PHASE	REC	DIVIDED CFG PULSE	REF 25Hz
		PB	CTL 25Hz	
	SPEED	COMMON	8MHz	CAPSTAN FG
	SPEED& PHASE	TRICK PLAY (STILL. SLOW)	MICOM CONTROL CAPSTAN DRIVE SIGNAL WITH STEP SLOW AND CAP C.L	

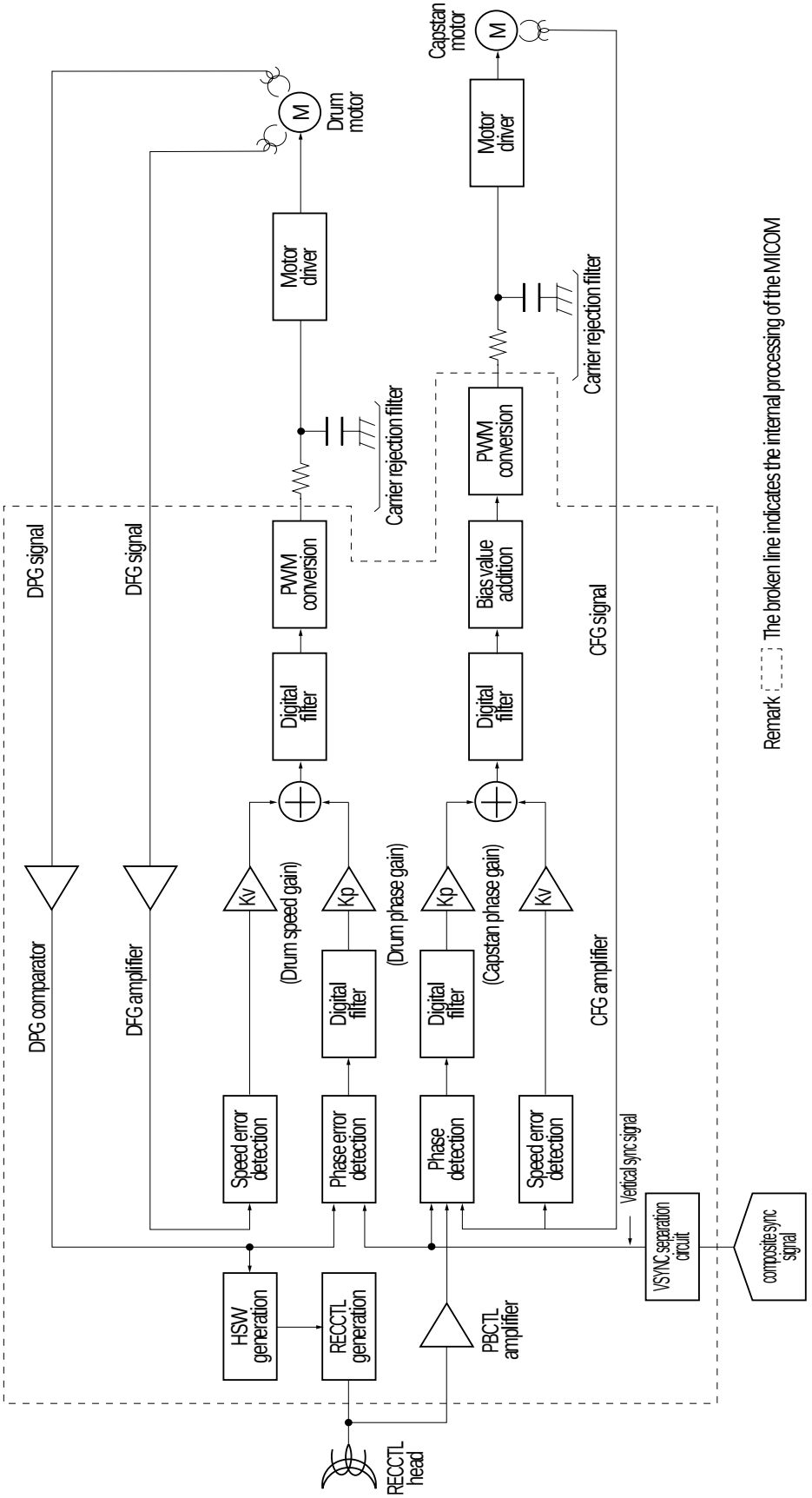


Fig. 7-18 Block Diagram

(2) Capstan Speed Error Detector

The capstan speed control operates so as to hold the capstan at a constant rotational speed, by measuring the period of the CFG signal. A digital counter detects the speed deviation from a preset value. The speed error data is added to phase error data in a digital filter. this filter controls a pulse-width modulate (PWM) output, which controls the rotational speed and phase the captain.
When the error is zero, the PWM circuit outputs a waveform with a 50% duty cycle.

The CFG input signal from the capstan motor is a square wave the CFG input signal is compared by a comparator and than sent to speed error detector as the CFG signal.
The speed error detector uses the system clock to measure the period of the CFG signal, and detects the deviation from a preset data value. The preset data is the value that would result from measuring the CFG signal period with the clock signal if the capstan motor were running at the correct speed.

The error detector operates by latching a counter value when it detects an edge of the CFG signal.
the latched counter provides 16 bits of speed error data for the digital filter to operate on.
The digital filter adds the speed error data to phase error data from the capstan phase control system,then sends the result to the pulse-width modulator as capstan error data.

(3) Capstan Phase Error Detector

The capstan phase error detector consists of a 16-bit counter, a capstan phase preset data register pair, a latch signal circuit driven by a feedback signal, and a captan phase error data register pair.

The capstan phase control in rec mode is executed by comparing HD S/W, which is synchronized with V-sync, with divided CFG signal. And than it does in playback mode by comparing HD S/W, which is synchronized with DFG and DPG, with PB CTL signal.

The latch signal for the phase error data in record mode is the divided CFG signal, which is divided from the CFG signal in the CFG frequency divider to a frequency of 25Hz.
In playback, the latch signal is the divided CFG signal obtained by frequency division from the rising edge of PB-CTL signal (playback control pulse signal).

The error data is a signed binary value centered on a phase error of zero (corresponding to the correct rotational phase). If the phase legs the correct phase ,the error is positive (+).
If the phase leads the correct phase, the error is negative (-).

(4) Drum Speed Error Detector

Drum speed control operates so as to hold the drum at a constant rotational speed , by measuring the period of the DFG signal . A digital counter detects the speed deviation from a preset value. The speed error data is added to phase error data in a digital filter. The filter controls a pulsewidth modulated (PWM) output,which controls the rotational speed and phase of the drum.

The DFG input signal from the drum motor is a square wave. The DFG input signal is compared by a comparator and than sent to the speed error detector as the DFG signal.

The speed error detector uses the system clock to measure the period of the DFG signal, and detects the deviation from a preset data value. The preset data is the value that would result from measuring the DFG signal period with the clock signal if the drum motor were running at the correct speed.

The error detector operates by latching a counter value when it detects an edge of the DFG signal. The latched count provides 16 bits of speed error data for the digital to operate on.
The digital filter adds the speed error data to phase error data from the drum phase control system, then sends the result to the pulse-width modulator as drum error data.

(5) Drum Phase Error Detector

Drum phase control must start operating after the drum motor is brought to the correct rotational speed by the speed control system . Drum speed control works as follows in record and playback.

- Record : Phase is controlled so that the vertical blanking intervals of the recorded video signal will line up along the edge of the tape.
- Playback : Phase is controlled so as to trace the recorded tracks accurately.

A digital counter detects the phase deviation from a preset value. The phase error data is added to speed error data in a digital filter. this filter controls a pulse-width modulated (PWM) output, which controls the rotation phase and speed of the drum.When the error is zero, the PWM circuit outputs a waveform with a 50% duty cycle.

The phase counter error detector compares the phase of the DPG pulse (tach pulse),which contains video head phase information, with a reference signal. In the actual circuit , the comparison is carried out by comparing the head-switching (HSW) signal,which is delayed by a counter that is reseted by DPG, with a reference signal. The reference signal is the REF 25Hz signal,which differs between record and playback as follows.

- Record : V sync signal extracted from the video signal to be recorded (frame rate signal, actually 1/2 V sync).
- Playback : 25Hz signal divided from the system clock.

(6) SW 25Hz Pulse Generation

The SW25Hz pulse is generated from IC601.

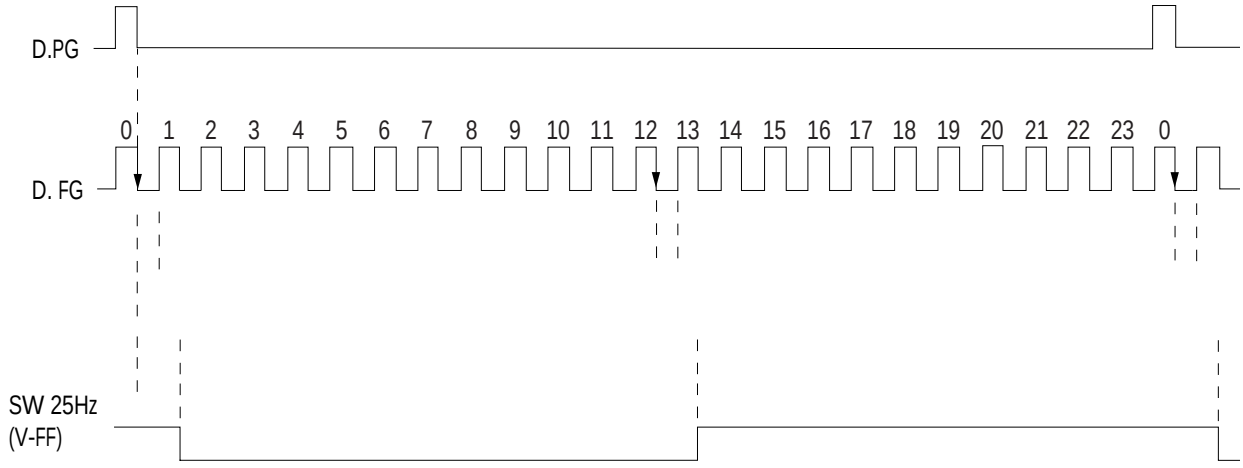


Fig. 7-19 SW 25Hz TIMING CHART

(7) V-Lock Phase

V-lock pulse is used for adjusting the picture's vertical vibration in trick play (still,slow).
The value is varied by tracking up/down key in trick play mode the variable range from 3H to 12H .
In trick play mode, the V-LOCK pulse position of CH-1 is variable but CH-2 is fixed.
During search mode ,both CH-1, 2 and V-LOCK position are fixed to 6.5H.

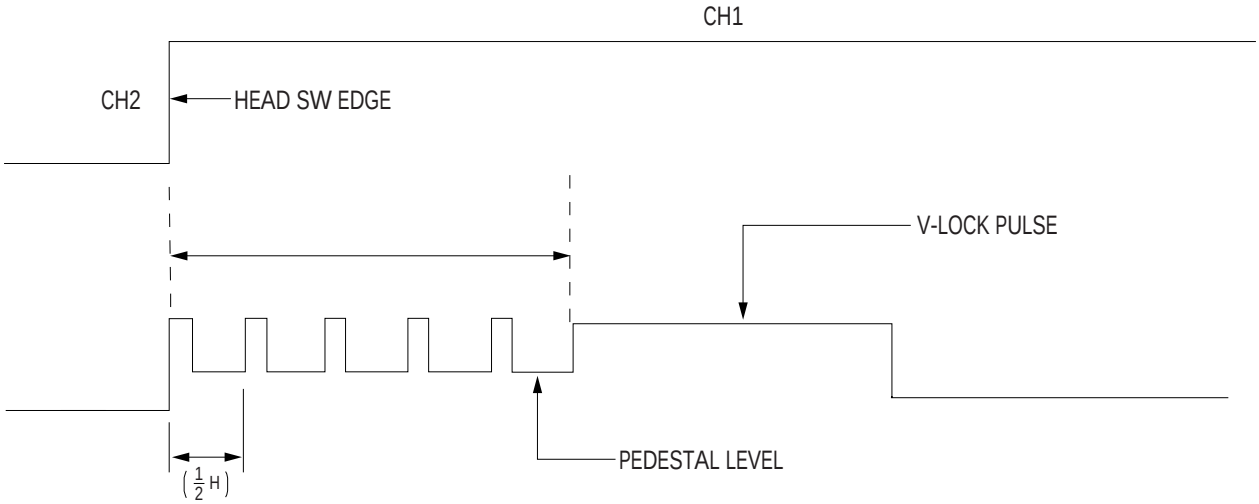


Fig. 7-20 V-LOCK PULSE

7-4 VCR Video

(1) Luminance Signal Recording System

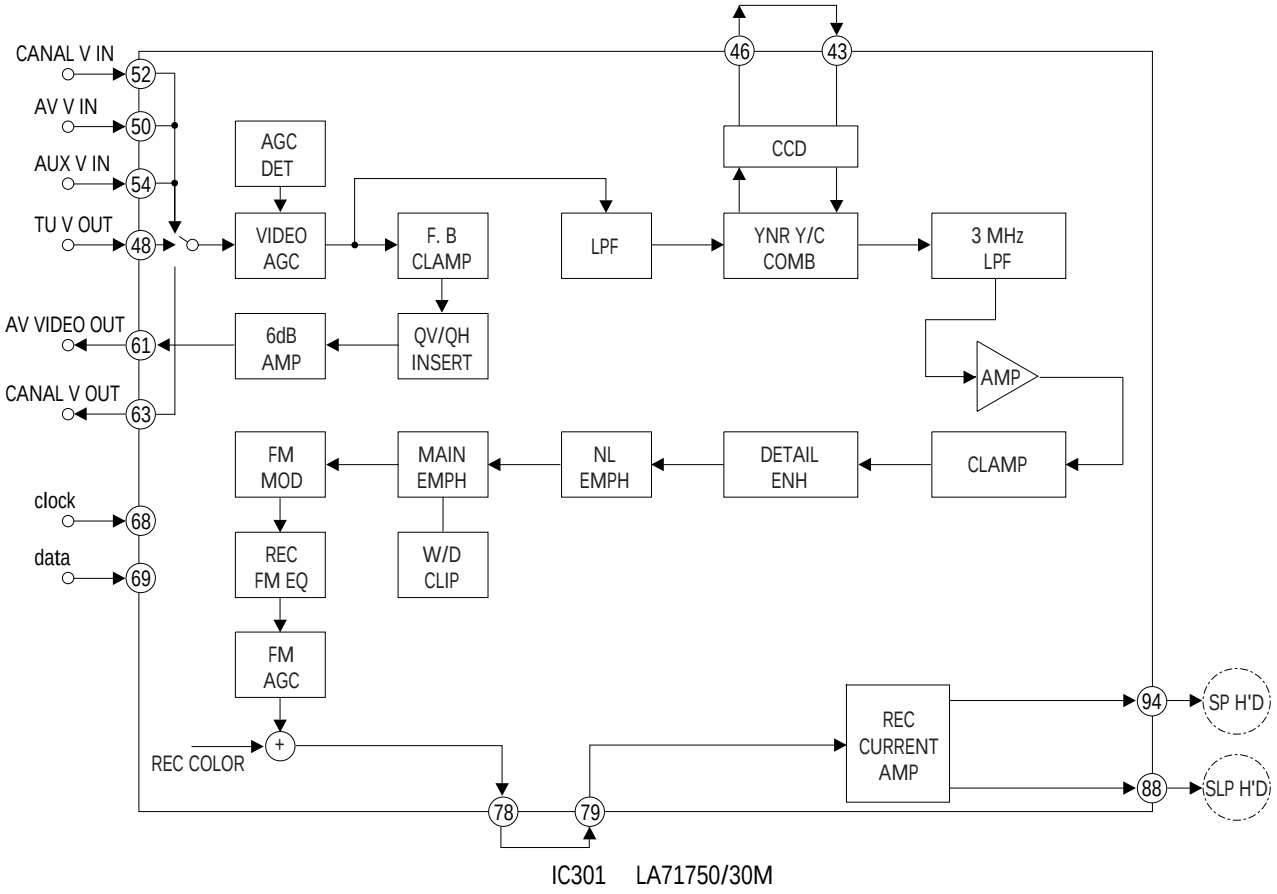


Fig. 7-21 Luminance Record Process

1) Outline

Fig. 7-21 shows the video signal recording system. Line input signal or tuner input signal is selected by Micom. Input selection is done with the INPUT SELECT button on the remote. The input select control signal is supplied to the pin 68(clock),69(data) of video IC from Micom IC.

The selected video input signal goes to pin 48(TUNER),50(AV), 52(CANAL), 54(AUX) of Lumi/Chroma processor IC (IC301). And then it enters VIDEO AGC circuit. The gain of AGC circuit is controlled by AGC detector so that the output is constant (approx. 2Vp-p). The output signal of AGC is clamped by the FBC(Feed Back Clamp) circuit. This signal appears at pin 26, after being amplified at the internal video amp and driver.

The output signal from the clamp circuit enter the detail enhancer circuit. In the detail enhancer circuit, the low level high frequency video signal is emphasized to improve the original signals frequency characteristics. onlinear emphasis circuit is employed to improve S/N and frequency response characteristics together with the following main emphasis. Noise effects the FM wave at a higher frequency, so the S/N can be improved by emphasizing the higher frequency before recording and by suppressing the play signal during demodulation. The difference of non linear emphasis from main emphasis is that the emphasis characteristics change is depending on the input level. The gain of the emphasis circuit is inversely proportional to the level of the high frequency component of the signal. That is, if the high frequency portion of the signal is low the main emphasis circuit will amplify the signal.

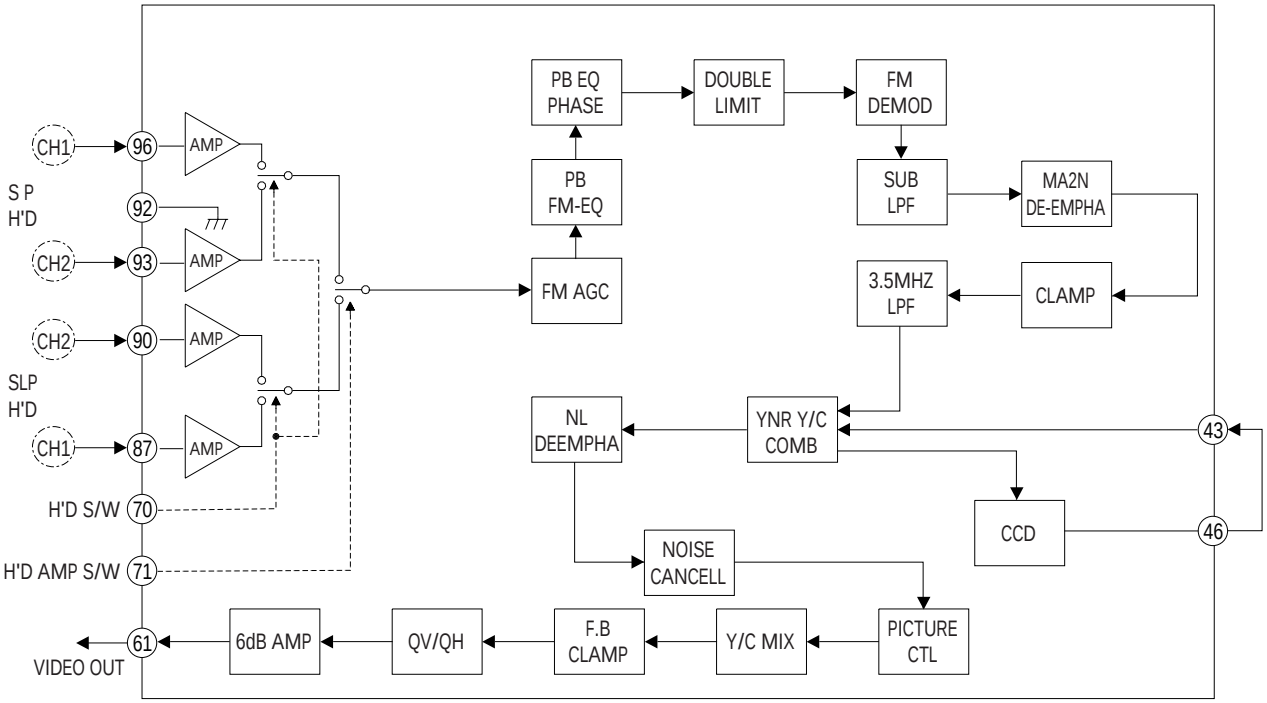
2) Main Emphasis Circuit
The dynamically emphasized luminance signal is now supplied to the main emphasis circuit where all the high frequency components of the signal are boosted more than the low frequency components. The boosting action is required for the high frequency components because in the FM recording method, the noise of the playback signal increases in proportion to the modulated signal frequency or low level signal. By using the nonlinear emphasis and main emphasis system, the total S/N ratio is increased. The output of the main emphasis circuit is then supplied to the white and dark clip circuit.

3) White and Dark Clip Circuit
After emphasis is performed, large overshoots and undershoots in the luminance signal are limited to a specified level. This is done to avoid FM over modulation. The output of the main emphasis circuit is then supplied to the FM modulator circuit.

4) FM Modulator
(a) The amplitude of the FM signal is limited, so the signal is recorded on tape near the maximum record level which increases the S/N ratio.
(b) The FM carrier is se to 3.8MHz (at the Sync tips) and the deviation to 4.8MHz by inside IC circuit (for the white peak). The actual device which constitutes the FM modulator is a stable multivibrator.
This multivibrator generates a sine wave output of variable frequency.
The frequency of sine wave is governed by the level of the processed video signal at any given point.
Therefore, the processed video signal varies the frequency of the sine wave which is frequency modulation (FM).
During playback in SLP mode, the crosstalk of the adjacent track is more apparent than is standard mode.
It appears as jitter and noise on the monitor. To reduce this noise from the screen, the FM carrier frequency has to be 1/2fh shifted up during recording. This is done by applying the head switching pulse to the FM modulator during SLP recording. The FM modulated luminance signal goes to record equalizer circuit and it is mixed with chrominance signal at the record Amp circuit inside video IC.

5) Record Amp
The frequency modulated luminance signal and chroma signal are mixed in the record amp of pre-amp block inside video IC. Then this mixed signal is amplified and supplied to the video heads via the rotary transformer and recorded on the magnetic tape.
Tape speed selection determines which video heads will be used.
That is, signal output from pin88 (SLP) and 94 (SP) of pre-amp block are supplied to video heads.
Control signal of speed mode is applied to pin 68(clock), 69(data) of video IC from Micom IC.

(2) Luminance Signal Playback System



IC301 LA71750/30M

Fig. 7-22 Luminance Playback Process

1) Outline

The video signal recorded on the tape is picked up by CH1, CH2 head and is supplied to pre-amp block via rotary trans. During playback, as per the speed, SP and SLP head is determined by Pin70 of respectively.
CH1 signal inputs to Pins 87 and 96 while CH2 signal inputs to Pins 90 and 93 of video IC. The pick up operation is controlled by the head switching pulse inputted to pin 70. During the high portion of the switching pulse, CH2 is picked-up and just the opposite is true for CH1. In the pre amp IC, the FM signal is amplified 60dB and this signal is applied to FM AGC.

2) FM AGC AMP

At the FM AGC Amp (FM), signals are automatically balanced. One of the AGC circuit outputs is fed to AGC detector circuit which detects signal level fluctuations. The detector output signal is applied to the FM AGC Amp to keep the output constant.This output is applied to the PB FM EQ block. FM EQ is correct the phase distortion and level. The signal through PB EQ circuit is applied to the double limiter.

3) Double Limiter Circuit

A FM signal on the tape which contains AM components will be read during playback. If there is a severe AM component, a drastic drop in FM carrier can occur. This lack of FM carrier can be called a noise region. Double limiting is used for improving the S/N ratio and carrier loss. The playback FM signal is split into two paths, one goes to high pass filler and sub-limiter. The other goes to the main-limiter after passing through a LPF. ONE path of the FM signal goes to the high pass filter, so that the low frequency(AM) component can be removed, and the other carrier is supplied to the sub-limiter. The output signal of sub-limiter is mixed with the signal from the low-pass filter and sent to the FM demodulation circuit.

4) FM DEMODULATOR
The FM demodulator consists of a stable mono multivibrator balanced modulator (BM) and a LPF. The FM demodulator circuit first converts the FM signal to a pulse width modulator signal. Then the circuit smoothes the PWM signal to demodulate the video signal. This demodulated signal is fed to the LPF to remove its FM carrier component and any other harmonics. The demodulated luminance is applied to the 3.5MHz LPF through main deemphasis circuit. To reduce demodulation noise, the output of the 3.5MHz LPF is applied to a non-linear deemphasis circuit through YNR circuit.

5) Main De-emphasis Circuit
Before modulation, main emphasis was performed. Because the high frequency components of video signal were boosted more than the low frequency components in the recording mode, main deemphasis must be performed to obtain a normal video signal. That is this circuit returns the emphasized high frequency component to the original value.

6) Non Linear De-Emphasis Circuit
This circuit is the counter part of the dynamic pre-emphasis circuit during recording. The characteristics are also the opposite of those in recording.

7) Drop Out Compensator/YNR Circuit
This circuit compensated for missing parts of the FM signal due to dust, dirt on the tape or irregular tape coating, etc. The clamped video signal is supplied to the CCD 1H circuit. The 1H delayed video signal from CCD block is also supplied to the 6MHz LPF to reject the sampling noise of CCD IC.
Then, the output of LPF is applied to Pin 43 of video IC. When the DOC detector detects the FM loss, a 1H delayed video signal is added in place of the missing signal.

8) Noise Canceller Circuit
The noise canceller circuit removes the high frequency noise contained in the video signal which has the reverse characteristics of the detail enhance in the recording mode. The output of the noise canceller circuit is supplied to the Luminance and Chrominance mixer circuit. The mixed chroma and luminance signal are then output at Pin 61.

(3) Chroma Signal Recording System

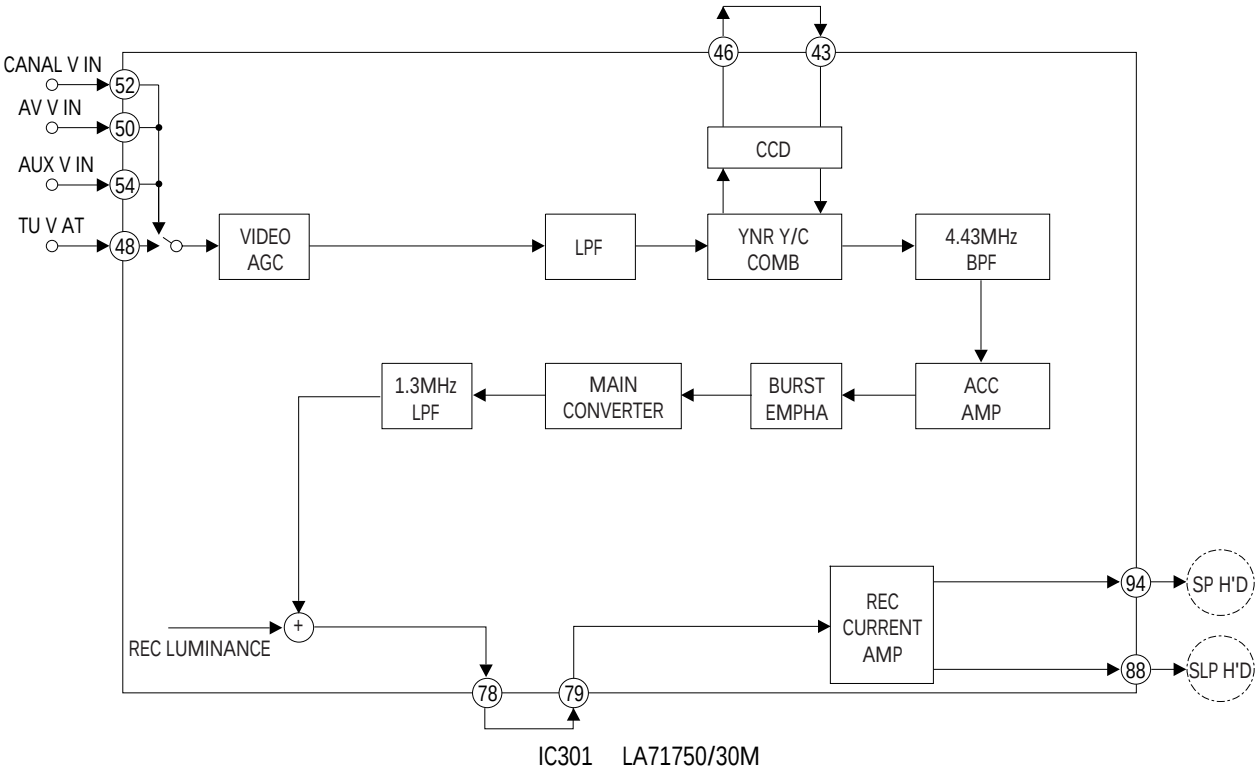


Fig. 7-23 Chrominance Record Process

1) Outline

Fig. 7-23 shows the chroma signal recording system. The chroma signal recording process is performed by video IC. The input video signal is supplied to Y/C COMB circuit through AGC AMP.

The output signal of Y/C COMB circuit is applied to ACC amplifier. The ACC amplifier is used for both burst ACC which keeps the burst level at a constant value in recording and the color ACC which controls the reference level of the burst ACC with the color signal level. The color ACC works to maintain a relatively high output level by boosting low level input signals to improve color S/N ratio. The signal is then applied to the burst emphasis circuit. Burst emphasis emphasizes the burst signal by +6dB during recording and feeds it to the main converter. The 4.43MHz signal are mixed in the main converter to perform frequency conversion.

The main converter is a mixer having the two types of output components which are the added frequency of 5.06+4.43=9.49MHz and the difference frequency component 627KHz.

Added frequency is rejected by the 1.3MHz LPF and the 627KHz down converted chroma signal is supplied to the luma/chroma mixer of pre-amp block and then recorded on the tape via the record amp and heads.

AFC detection is performed with the head switching pulse and the fh signal generated from 321fh VOC output. The detector output controls the VCO frequency which will be locked precisely at 321fh (5.016MHz).

he 321fh signal is counted down to 1/8 and the resultant 40.125fh (=627KHz)carrier signal is phase shifted triggered by each horizontal sync signal which is wave shaped as a 50% duty pulse by the pulse generator.

The direction of the rotational phase shift depends on the levels of the rotary head switching signal and when the switching signal is "H" level, the phase is retarded by 90 degrees for every 1H, and when is is at a "L" level it will advance by 90 degrees for every 1H this 40fh phase shifted sub-carrier (PSSC) signal enters the sub-converter and the 4.43MHz carrier signal is locked at the color burst frequency by the record APC.

The PSSC signal is frequency converted into 4.43MHz +/-627KHz. Then 5.06MHz component (=4.43MHz+/-627KHz)is extracted through a 5.06MHz BPF. The 5.06MHz signal is used as a carrier signal for down conversion of the color signal as described previously.

2) ACC (Automatic Color Gain Control) Circuit

The ACC is used as burst ACC in the LP mode, however it is also used for peak ACC in the SP/SLP mode. The purpose of using two different ACC operations is to improve the overall Chroma S/N ratio during playback. In SP and SLP, there is H-sync alignment. This indicates that there is bust alignment as well. Whenever two video tracks overlap or a video head picks up crosstalk from an adjacent track, beats are produced during playback. Perhaps the most noticeable beats are produced by H-sync and burst. But in SP and SLP, these beats occur right at H-sync and burst and are out of the picture. In LP, however, there is no H-sync alignment and these beats can be seen in the picture. To keep the beats at a minimum in LP, we keep the burst level constant so that the beat intensity is constant. We know that ACC acts to improve the color S/N,and in LP, the ACC detector locks at the burst level,and keeps it constant. Thus we have ACC operation with the least beats. In SP and SLP, the beats caused by burst overlap are out of picture, so we don't really mind if the burst level changes or not. To improve the color S/N ratio even more,we use peak ACC in SP and SLP.That is,if the chroma level is too low to record, the amplification degree is increased by 3dB. However, the chroma level is sufficient for recording, this peak ACC is changed to burst ACC to avoid over amplification. By changing the ACC according to picture color content, the burst level may vary. The color ratio improvement is based on the color content itself during SP and SLP provides a somewhat better S/N ratio.

3) Four (4) Phase Rotation

CH1 is advanced 90 degrees every channel, while CH2 is delayed 90 degrees. When the frequency is set to 627KHz, if phase is shifted by +/-90 it becomes 627KHz +/-90. The 40fh+/-90(=627KHz +/-90)is balanced modulated via fsc (4.43MHz) depending on which side band is detected. That is, the fs +40fh+/-90 (4.2MHz+/-90) of total frequency is supplied to the main converter. In record mode, the signal operates same as in play back mode. During playback, the phase is returned to original state.

4) AFC (Automatic Frequency Control) Circuit

Luminance signal is input to H-sync separator. The H-sync is separated and supplied to phase comparator. This signal can be described as fh (Horizontal Sync frequency of input video signal). However, VCO oscillates at 321fh(5.016MHz). This 321fh is counted down by 1/8 and 1/40 and resultant fh is supplied to phase comparator. fh and fh are supplied to the phase comparator for comparison of their phases. After comparison, the phase differences is output to VCO (321fh) in terms of error voltage. Therefore, the oscillation frequency of VCO is controlled by this error voltage. That is, if the fh phase is changed by H-sync signal fh, error voltage is changed accordingly and if the phases of fh and fh are met due to change of VCO oscillation frequency, error voltage does not feedback. 321fh VCO is oscillated in accordance with phase sync at fh. Therefore, 40.125fh input to sub converter by phase shift is always sync horized with phase. The AFC loop performs the same operation during record and playback. In recording, phase of VCO is in accordance with H-sync signal of current video signal. Which in playback, the phase sync of VCO is consistent with H-sync signal which is separated from the video signal.

(4) Chroma Signal Playback System

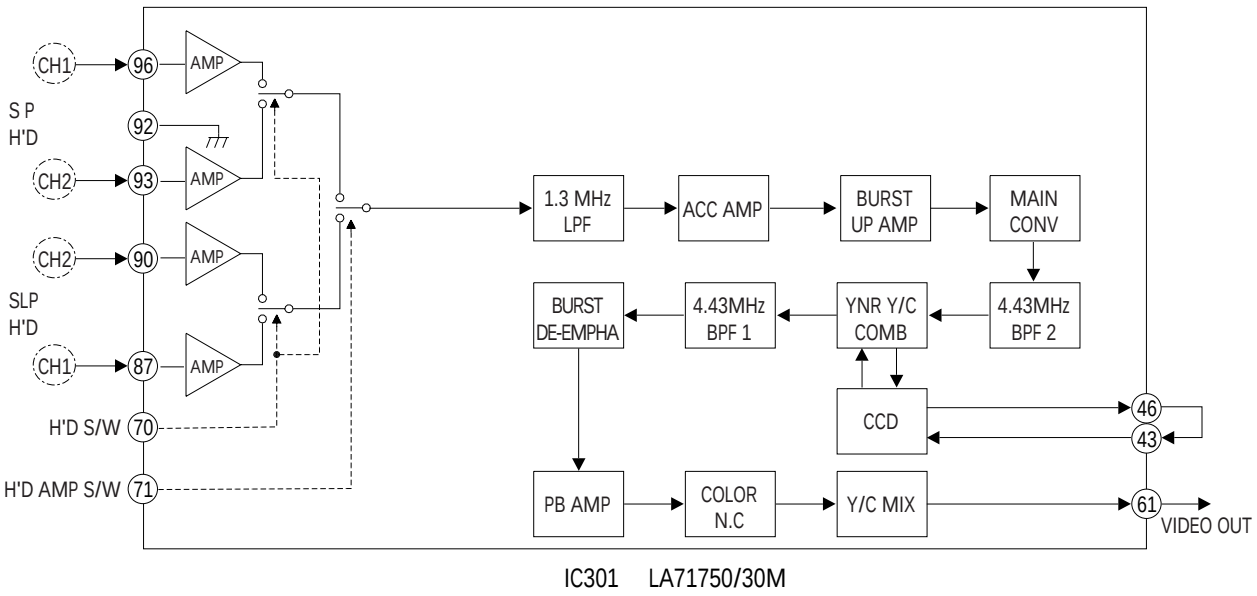


Fig. 7-24 Chrominance Playback Process

1) Outline

Fig. 7-24 shows the chroma signal playback system.
The FM signals picked up by the CH-1 and CH-2 video heads are supplied to the pre-amp block.
The FM signal from CH-1 and CH-2 are alternately selected by the switch and output signal as a continuous signal. Goes to the ACC amp through the 1.3MHz LPF. The 1.3MHz LPF is used for passing only down converted 627KHz chroma signal in the playback mode. The ACC amp stabilizes the 627KHz color signal level.
The output color signal from amp then enters the main converter circuit. In the main converter circuit this signal is mixed with the 5.06MHz phase shifted carrier signal and converted into 5.06MHz + 627KHz signals.

2) Main Converter

Inside of IC, the main converter converts the 627KHz rotational chroma signal to a 4.43MHz non-rotational signal. The two inputs of this main converter are the 627KHz signal, which comes from the output of the ACC, and a 5.06MHz which has the same rotational phase as the 627KHz signal. It is important that the rotational phase of the 5.06MHz signal is the same direction as the 627KHz playback chroma signal. To obtain the 4.43MHz non-rotational stable signal, the same direction rotational signal should be mixed with the rotational chroma signal. During the conversion process, the phase is also mixed by the frequency. Therefore, when 627KHz is subtraced from 5.06MHz,the result is the non-rotational 4.43MHz stable signal. The output signal of the main converter goes to the 4.43MHz BPF. In the 4.43MHz BPF,the conversion noise(5.06MHz+627KHz=5.7MHz) is rejected and the 4.43MHz color signal goes to the comb filter.
In the comb filter, the crosstalk components due to the adjacent track are eliminated and the color signal is applied to PB-AMP, BURST De-Emphasis, Killer and are applied to LUMA and CHROMA mixer input through the CNC block.

7-5 Hi-Fi Audio

(1) Outline

Hi-Fi circuit consists of HiFi audio LPF, VCO, BPF, FM detect circuit and switching noise compensator, PRE-AMP etc. Linear audio consists of an ALC circuit,REC EQ circuit and a PB EQ circuit.
Hi-Fi and Linear audio share the same input selector,output selector and mute circuit.

1) REC Mode (L-CH Only)

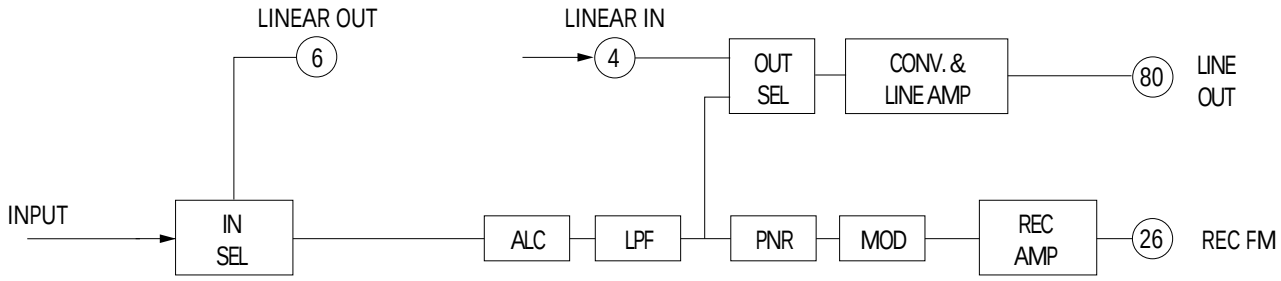


Fig. 7-25 REC Mode (L-CH Only)

2) PB Mode (L-CH Only)

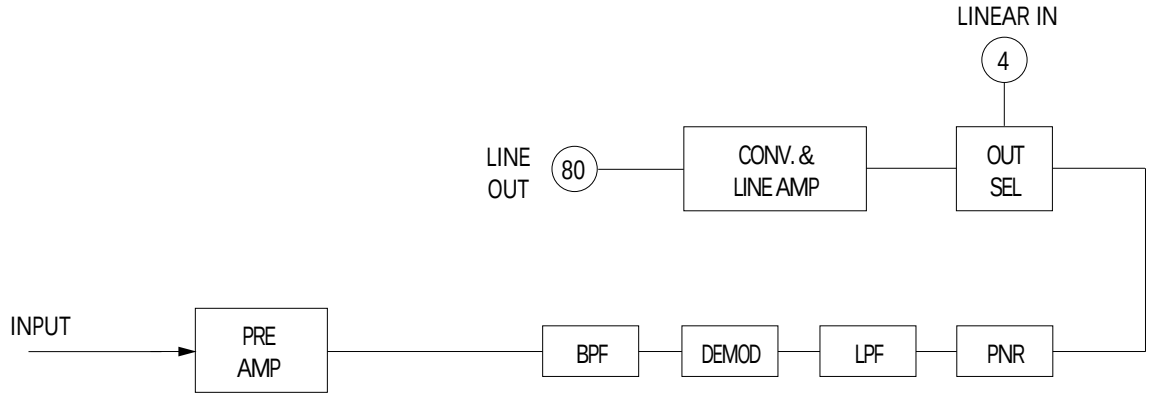


Fig. 7-26 PB Mode (L-CH Only)

(2) Block Description

1) Input Selector
Input selector outputs 1 signal from 4 different signals received. It outputs 1 selected signal from tuner, rear, front.

2) Normal(Linear) Selector
Two signals,L-CH and R-CH are inputed to Hi-Fi IC.But,linear audio is capable of receiving only one signal. Therefore the 2 input signals must be selected. Usually,the outputs are mixed signals of L-CH and R-CH unlike the input selector, the normal selector does not amplify the selected signal.

3) Output Selector
It selects to output Hi-Fi L-CH,Hi-Fi R-CH,LINEAR and MIX(Hi-Fi+LINEAR) signals with the final output7 IC pin 78(R-CH) and pin 80(L-CH).

4) Output ALC(Convertor)
ALC is used because when the input level of RF converter gets bigger,it shows up as noise on the screen. But, this block is not used this model(ALC OFF)

5) PNR(Peak Noise Reduction)
It is a type of emphasis,de-emphasis function to eliminate noise during modulation /demodulation PNR operates as that of VHS FORMAT to reduce noise.

6) Audio Limiter
Before modulating the signals from PNR block, it limits signals exceeding the size limit to max deviation of +/- 150KHz.

7) VCO(Voltage Control Oscillation)
It is a modulation function that oscillates 1.3MHz(L-CH) and 1.7MHz(R-CH)

8) RF LPF
It is a function to eliminate the harmonic components of Hi-Fi carrier formed during VCO, which may affect other block. It's pass-band approximately 2MHz.

9) MIXER
It mixes the Hi-Fi carrier formed in L-CH and R-CH. However,due to the frequency difference between L-CH and R-CH,when equal amount of R-CH is recorded to tape,R-CH is must smaiier than L-CH.
Therefore, the R-CH output is approximately 10dB bigger than L-CH.

10) Current Amp
It is the final amplifier which change the size of Hi-Fi envelope.

11) AGC(Auto Gain Control)
It maintains uniform size of Hi-Fi envelope,which is inputed by pre-amp in play back mode.

12) BPF(Band Pass Filter)
L-CH and R-CH each has BPF. The center frequency is same as carrier frequency.
It is used to receive only Hi-Fi carrier from all signals inputed to pre-amp.

13) SW Noise Compensation
Unlike the linear audio,insted of using fixed head,drum heads are used,which creates halting points However, in order for the audio to be headed continuously, the damages from halting points are modulated, which creates noise. SW noise compensation is a block to minimize this particular noise.

14) Hold Pulse

It makes standard signal(Pulse) to compensate SW noise.

15) DET(Hi-Fi/LINEAR)

From the Hi-Fi envelope inputed from pre-amp,it decides whether the signal passing through L-CH BPF is Hi-Fi or LINEAR tape it's size(the signal passing through BPF is below 10mVpp, it is not Hi-Fi, therefore, it output linear)

16) DOC(Drop Out Compensation)

If demodulation is conducted without properly treating the damage on Hi-Fi envelope caused by scratch on the tape,noise occurs.

In order to improve this noise occurrence, DO DET compensate the drop-out using the same methode of compensating the switching noise when the damage on the envelope ranges 10~15mVpp.

17) ENV DET

To obtain optimal tracking,envelop must be peak to peak and micom should be in DC. It is a function to convert Hi-Fi envelop to DC. If it is lower than 0.8V at micom,it sends linear mode date to HiFi IC.

18) Serial Data Decoder

It receives I2C BUS to enable the operation of inner block and decodes into serial data.

7-6 Linear Audio

(1) Block Diagram

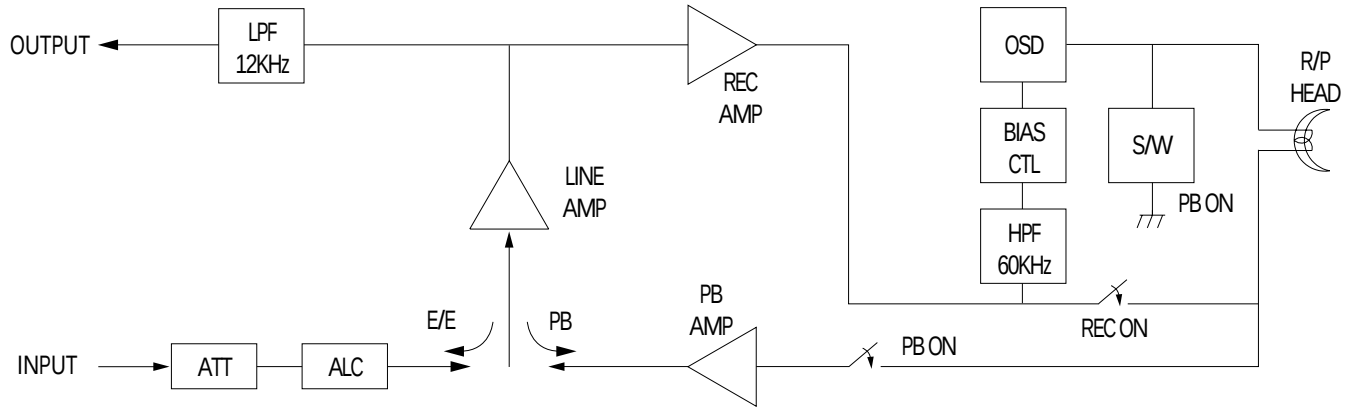


Fig. 7-27 Block Diagram

(2) Block Description

1) ATT (Attenuation)

Line amp is shared between PB mode and E/E mode, which reduces the recorded signal by 20dB and resister.

2) ALC (Auto Level Control)

If the signal level is lower than the reference signal (-6dBm) level, the output signal will equal the input signal. However, if the input signal is higher than the reference signal, the output will not equal the input and will gen erate uniform signal.

* ALC Application Purpose : Since linear audio is in AM (amplitude modulation) and uses magnetic recording device, it only records limited size and as the size of input signal increases, distortion increases. To prevent this occurance, mark sure the signal does not get bigger even if the level of distortion repodly increases.

3) LINE AMP

Line amp's gain is approximately 23dB. The purpose of the line amp is to amplify to 68dB in order to obtain the recorded signal on the tape during playback. As the amp gain increases, the passband decreases, which enables the amplification of low frequency. However, it is impossible to amplify frequency of 10KHz to 68dB with just 1 OPAMP. Therefore, to satisfy frequency and gain.

Line amp must be constructed into 2 steps of OP AMP. (gain is fixed within IC)

4) 12KHz LPF

There are various noises to signal output. The loudest noise is the "Video SYNC Frequency" of 15.734KHz In order to eliminate the "Video SYNC Frequency", "LPF" and "TRAP" are combined to "LPF".

5) PB AMP

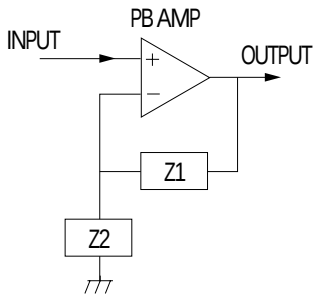


Fig. 7-28 PB Amp

The diagram to the left is the playback amp and the gain input/output are as follows.

$$Av = 1 + \frac{Z_1}{Z_2} \approx \frac{Z_1}{Z_2}$$

The playback characteristic of VHS format can be satisfied by using Z_1, Z_2 in the above equation.
PB amp gain should be designed to be approximately 45dB (1KHz).

6) REC AMP

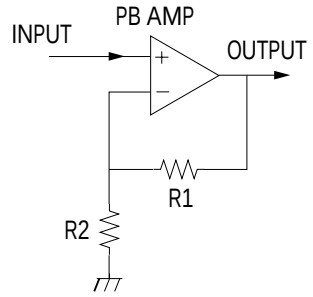


Fig. 7-29 REC Amp

The diagram to the left is REC AMP. The amp gain is approximately 14dB.
R_1 and R_2 that determine the gain is located inside the IC.
It is uniform and independent to frequency. Frequency characteristics should be considered when designing rec amp. The REC amp should be the opposite to playback characteristics.

7) OSC (Oscillation)

Oscillation frequency is 70KHz. It's size is approximately 40Vp-p. it operates on recoed mode. It is supplied to audio erase head and full erase head used to erase already recorded signals.
Also, it conducts "AM (Amplitude Modulation)" using oscillation signals.

8) BIAS Control

Output level changes according to the impedance of F/E, A/E and R/P head connected to the coil.

9) 60KHz HPF

There must be standard signal for bias control and that signal uses HPF only to obtain oscillation signal that comes through R/P head.

10) S/W

The switch opens when recording, shorts during playback and exterior transister is used.

7-7 TM

(1) Outline

RF and frequency synthesized tuning system
General description : The receiving circuit consists of both ANT input and output circuits, channel selection circuit, PIF circuit and SIF circuit. The receiving circuit selects a desired broadcast signal from TV signals induced on an antenna and sends stable video and audio signals to their respective processing circuits. The output signals from the video and audio circuits are converted into a conventional TV signal modulated for channel 3 or channel 4 by an RF modulator so that the signal can be received by conventional TV receivers.

(2) Tuner modulator block

As explained, this model is designed in one package to contain a RF MODULATOR BLOCK, TUNER BLOCK AND IF DEMODULATOR BLOCK. Its size is greatly reduced and other noise interference can be minimized to make performance high.

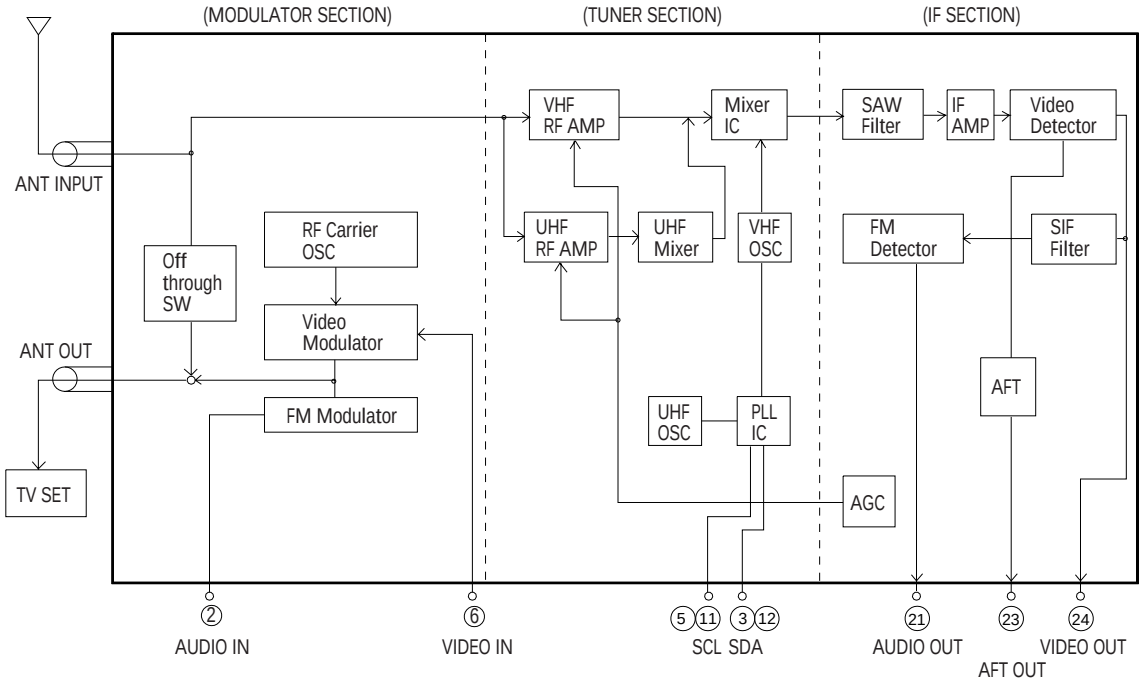


Fig. 7-30 Tuner/demodulator Block Diagram

(3) Modulator Section

A. RF Modulator generates, from a baseband video and audio signal, PLL frequency synthesized RF TV channel signal in VHF band. (3ch = 61.25MHz, 4ch = 67.25MHz)
B. PLL synthesized audio FM (4.5MHz).
C. The 4.43MHz reference frequency for PLL can either be generated internally or input from an external source.

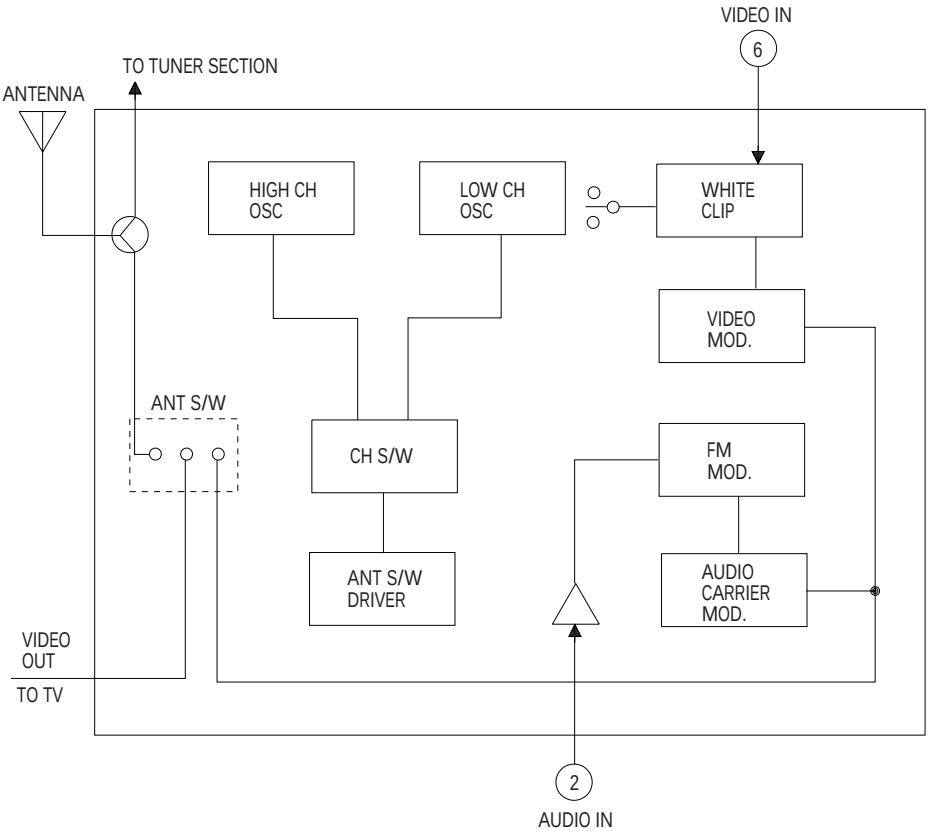


Fig. 7-31 Modulator Section Block Diagram

(4) Tuner Block

A. Low pass filter & high pass filter
This consists of IF trap circuit and UHF & VHF separation circuit. If the input signal is IF(45.75MHz), this filter prevents interference.

B. Single tune & RF AMP
This consists of a filter circuit, RF AMP, impedance conversion circuit, image trap and a single tuning circuit. It prevents noise and other interference signals. RF AMP is controlled by AGC come from IF DEMOD block.

C. Double tune
It consists of a double tuning circuit to improve rejection characteristic which results in a better band characteristic.

D. MOP IC (Mixer, OSC, PLL)
It consists a VHS and UHF OSC and mixer circuit. We applied a double balance mixer to have better rejection characteristic, it shows especially various beat characteristic.
It serects channels and contains charge pump band driver. The minimum step standard frequency 27.97KHZ.

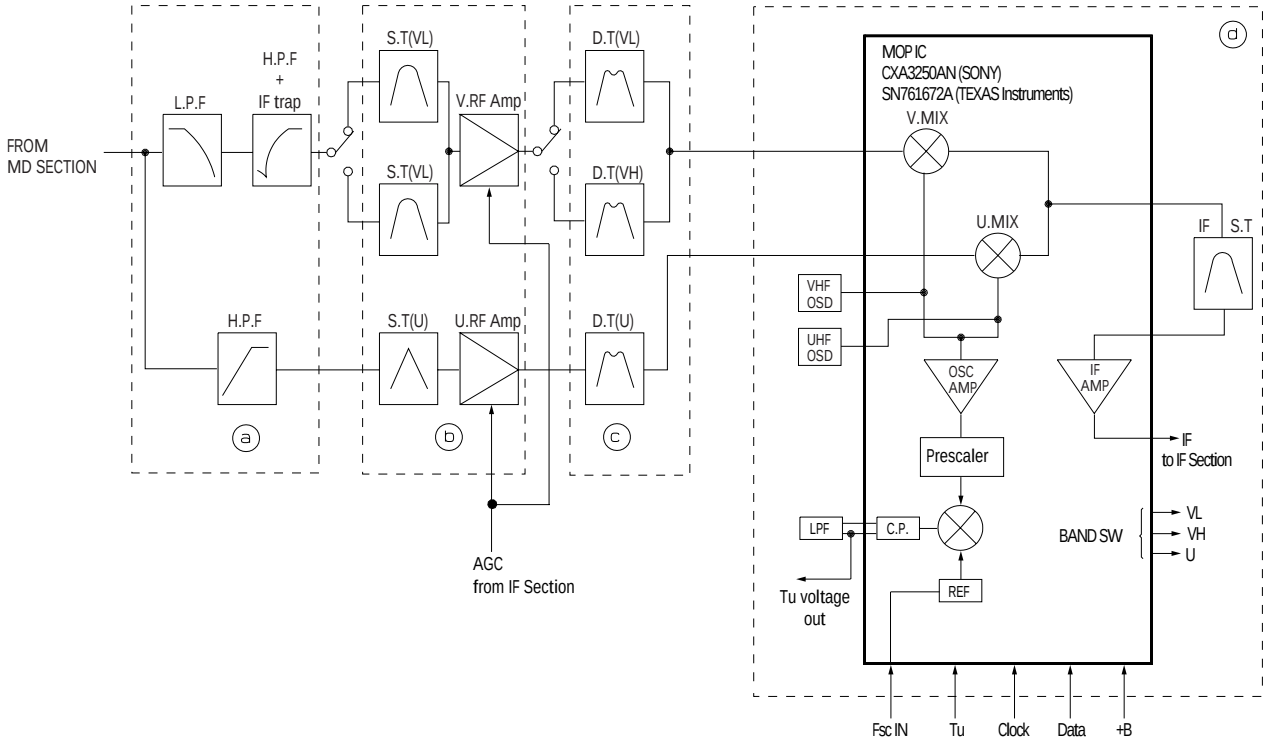


Fig. 7-32 Tuner Section Block Diagram

(5) IF Block

A. SAW FILTER
It passes only needed band of the signal that is converted to IF frequency and decrease other band to minimize the effect of adjacent channel.

B. IF AMP
IF signal ,which is selected in SAW FILTER, is amplified in IF amp frequency enough to be detected. The IF AMP has parallel inputs & outputs structure and consists of 3 series step AMP.Each step has about 20dB gains.These gains are controlled by AGC voltage has maximum 63dB attenuation range.

C. RF AGC CONTROL
It is adjusted to determine RF AGC working point in tuner.

D. FM DETECTOR
After removing AM signal in the limiter AMP ,amplified SIF signal is applied FM detector.
This FM detector is PLL detecting type.

E. AFT DETECTER
AFT automatically controls the OSC frequency in the tuner, so that it retains a constant level.
It is a quadrature detection type. The carrier, which is detected from video det is directly input to AFT detector . The 90 degree delayed phase signal is input at the same time to AFT detector and ,the results come out.
Detected AFT voltage is amplified by DC AMP and then applied to pin 13.

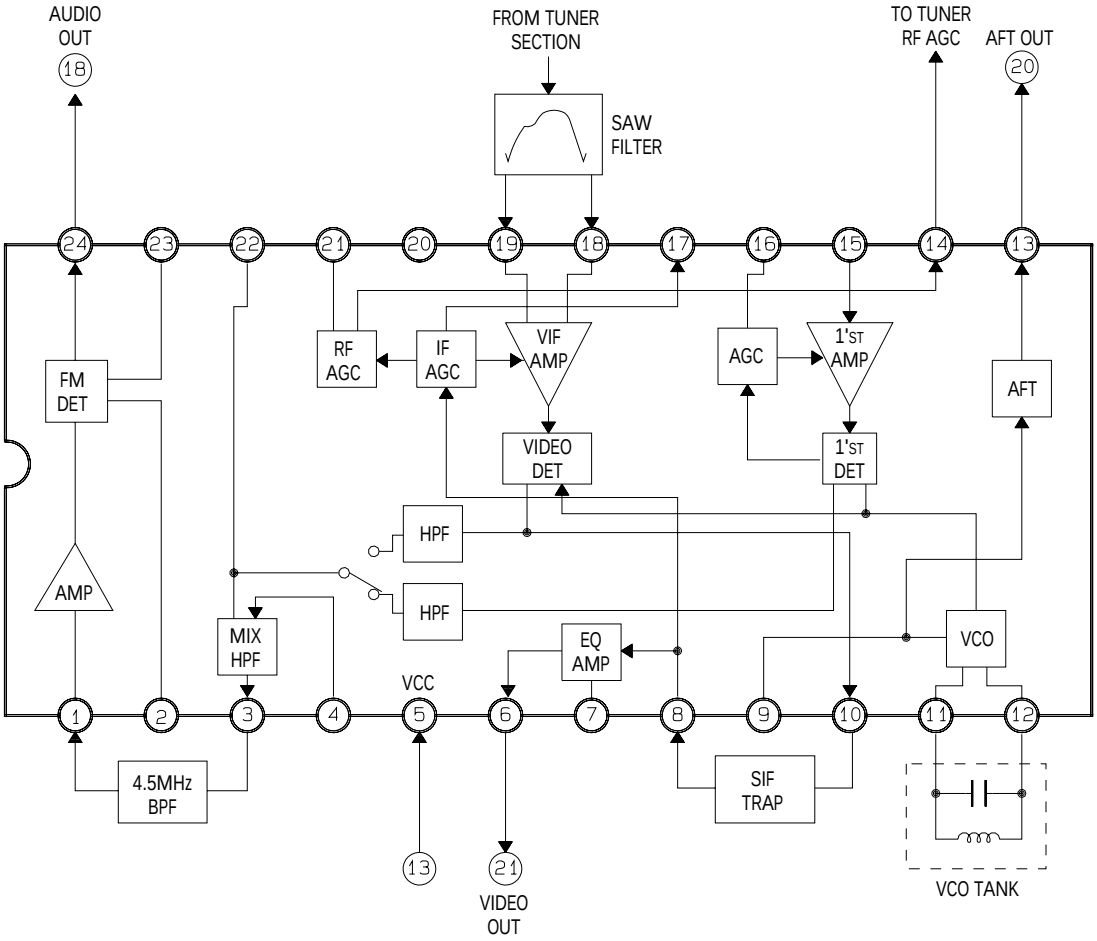


Fig. 7-33 IF Ssection Block Diagram

7-8 MTS

1) Outline

The Multiplex signal that come from Tuner/demode block(TM block IF DEMOD) enters into the MTS IC11 pin and sap or stereo signal can be detected. The components of the signal are roughly separated 4 areas(stereo,dbx,matrix and sap)

2) STEREO BLOCK

(a) L+R(Main)

After the audio multiplexing signal input from SIF (pin48) passes through VCA, the SAP sinal and telemetry signal are suppressed by STEREO LPF. Next,the pilot signals are canceled.
Finally,the L-R signal and SAP signal are removed by MAIN LPF,and frequency characteristics are flattened (de-emphasized) and input to the matrix

(b) L-R(SUB)

The L-R signal follows the same course as L+R before the pilot signal is canceled. L-R has no carrier signal,as it is a suppressed-carrier double side band amplitude modulated signal(DSB-AM modulated). For this reason,the pilot signal is used to regenerate the carrier signal(quasi-sine wave) to be used for the modulation of the L-R signal.

3) SAP BLOCK

SAP is an FM signal using 5fh as a carrier as shown in the Fig(base band spectrum) First,the SAP signal only is extracted using SAP BPF. Then,this is subjected to FM detection.
Finally,residual high frequency components are removed and frequency characteristic flattened using SAP LPF,and the SAP signal is input to the dbx-TV block.

4) dbx-TV BLOCK

Either the L-R signal and SAP signal input is selected by the mode control and input to the dbx-TV block.
The input signal then passes through the fixed de-emphasis circuit and is applied to the variable de-emphasis circuit.
The signal output from the variable de-emphasis circuit pass through an external capacitor and is applied to VCA(Voltage Control Amp) Finally, the VCA output is converted from a current to a voltage using an operational amplifier and then input to the matrix.
The variable de-emphasis circuit transmittance and VCA gain are respectively controlled by each of effective value
detection circuits. Each of the effective value detection circuit passes the input signal through a predetermined filter for weighting before the effective value of the weighted signal is detected to provide the control signal.

5) MATRIX

The signals(L+R,L-R,SAP) input to “MATRIX” become the outputs for the ST-L,ST-R,MONO and SAP signals according to the mode control.

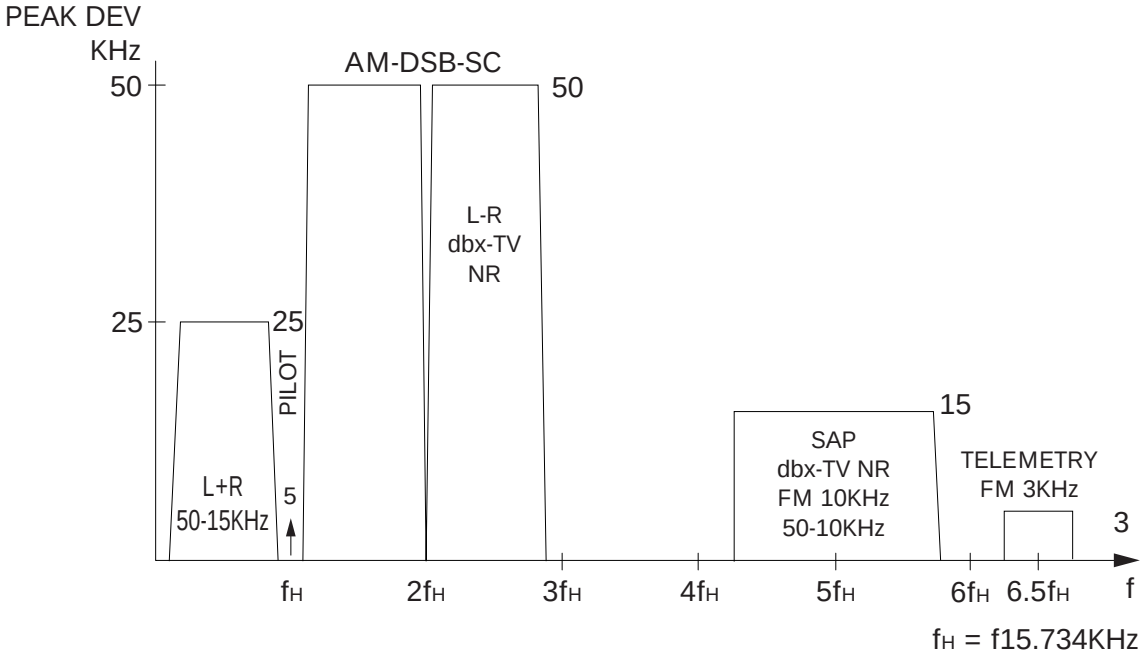


Fig. 7-34 Base Band Spectrum

7-9 OSD

The on screen display circuit consist of a character generator decoder, video mixer, sync separator and sync generator, sync detector circuit.
The data is decoded and generates characters in syncro with composite video signal applied pin 19.
Also the sync detector circuit discriminates the presence of a video signal by detecting sync, if no sync is detected, a blue screen is displayed. In other word, the OSD circuit displays character on the video when there is a video signal or on blue screen when there is no video signal. (No sync).

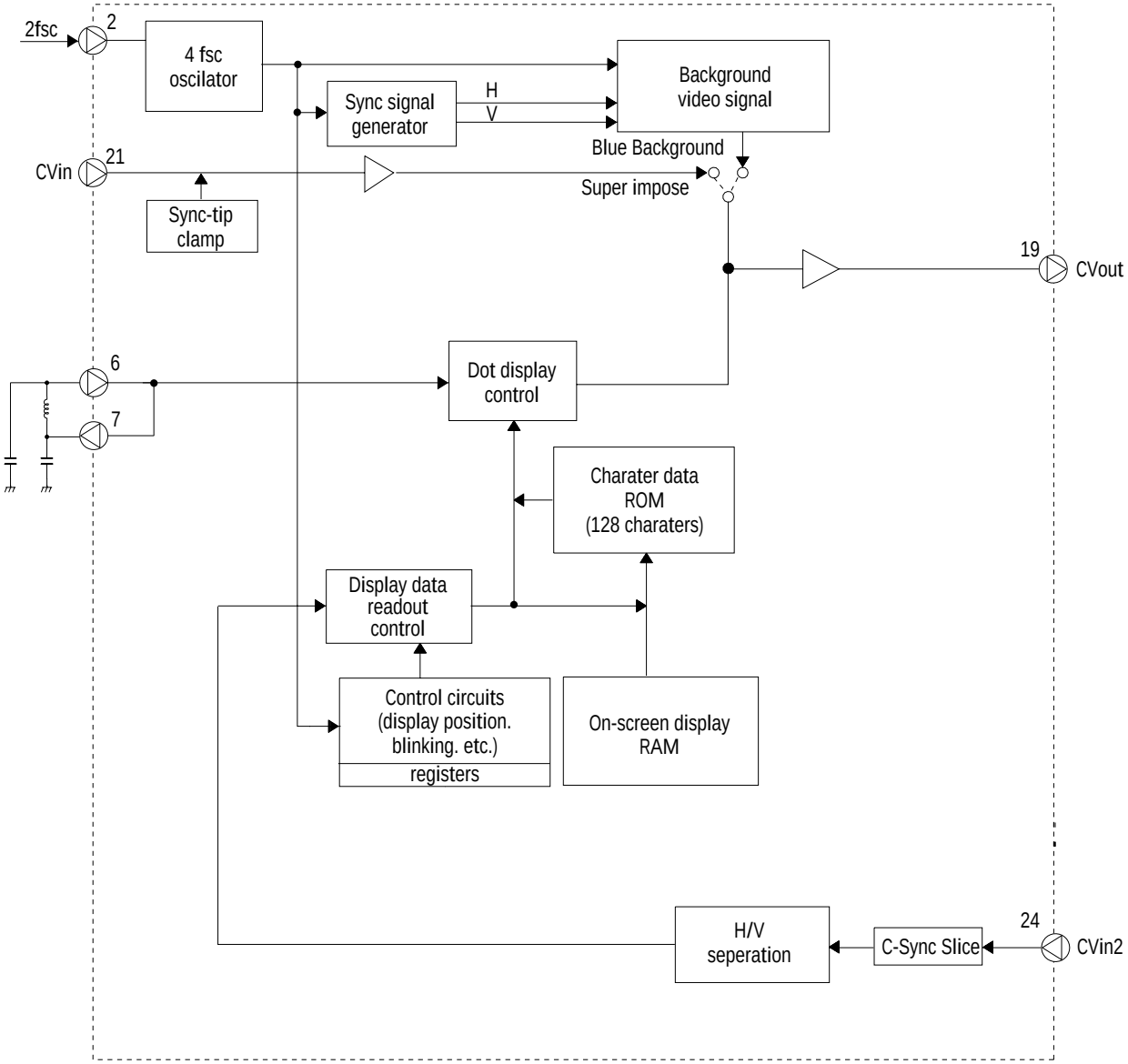


Fig. 7-35 Block Diagram

7-10 SECAM

(1) REC Mode

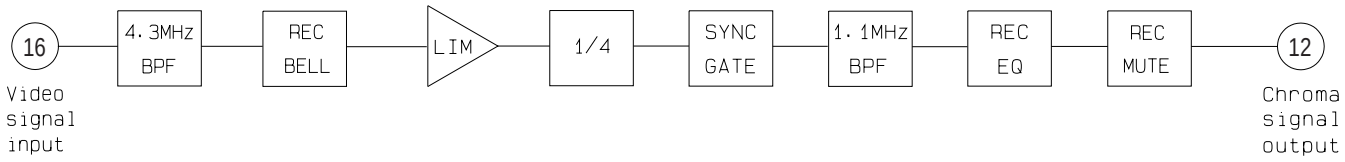


Fig. 7-36 Signal flow in REC mode

Video signals which input to Pin 16, pass 4.3MHz BPF, unnecessary component (ex : sync signal) is removed, and take component of chroma signal. And to be flat the characteristics when it is sending by REC-BELL circuit. This REC-BELL circuit is automatically adjusted to be 4.286MHz for center frequency. After that,the pulse width is limited by limiter amplifier pass the 1/4 divided circuit and converted to 1/4 for chroma signal frequency. As for converted signal, the noise of non-signal parts of sync signal is amplified by limiter amplifier, in order to be remove components of the sync signal generates by sync gate circuit. Also this signal is squarewave, and contains unnecessary components, at first, through 1.1MHz BPF and nextinput to REQ-EQ. REC-EQ has the same characteristics of BELL characteristics, automaticallyadjust to be 1.0715MHz for center frequency. Afterwards, unnecessary components around the sync signal are muted, low chroma signal is output to Pin 18 after through Buffer. This mute circuit also has the function of remove unnecessary component during vertical sync signal and output control owing to Pin 1.

(2) PB Mode

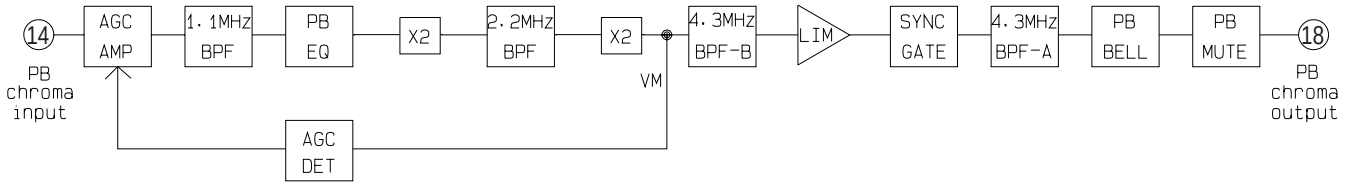


Fig. 7-37 Signal flow in PB mode

The signal which input from Pin 14, at first enter AGC amplifier and adjust for lever. Gain of this AGC amplifier is controlled to be fixed the 4fsc clock generator with PLL circuit of output level(VM) which shows below. Thus, pass the 1.1MHz BPF, remove unnecessary components, input to PB-EQ which has 1.1MHz Anti-BELL characteristic. This center frequency of PB equalizer, automatically adjusted to be 1.0715MHz. Next, enter 4fsc clock generator with PLL circuit. +4.3MHz BPF remove unnecessary, component of frequency generate in 2fsc clock generator owing to limiter amplifier are cleaned by performance of sync gate circuit. This signal has a rectangle waveform, for contain unnecessary components of frequency, due to through 4.3MHz BPF, next input to PB-BELL. PB-BELL automatically adjust to 4.286MHz of center frequency, and return to BELL characteristics when it is sending.

(3) Block Diagram

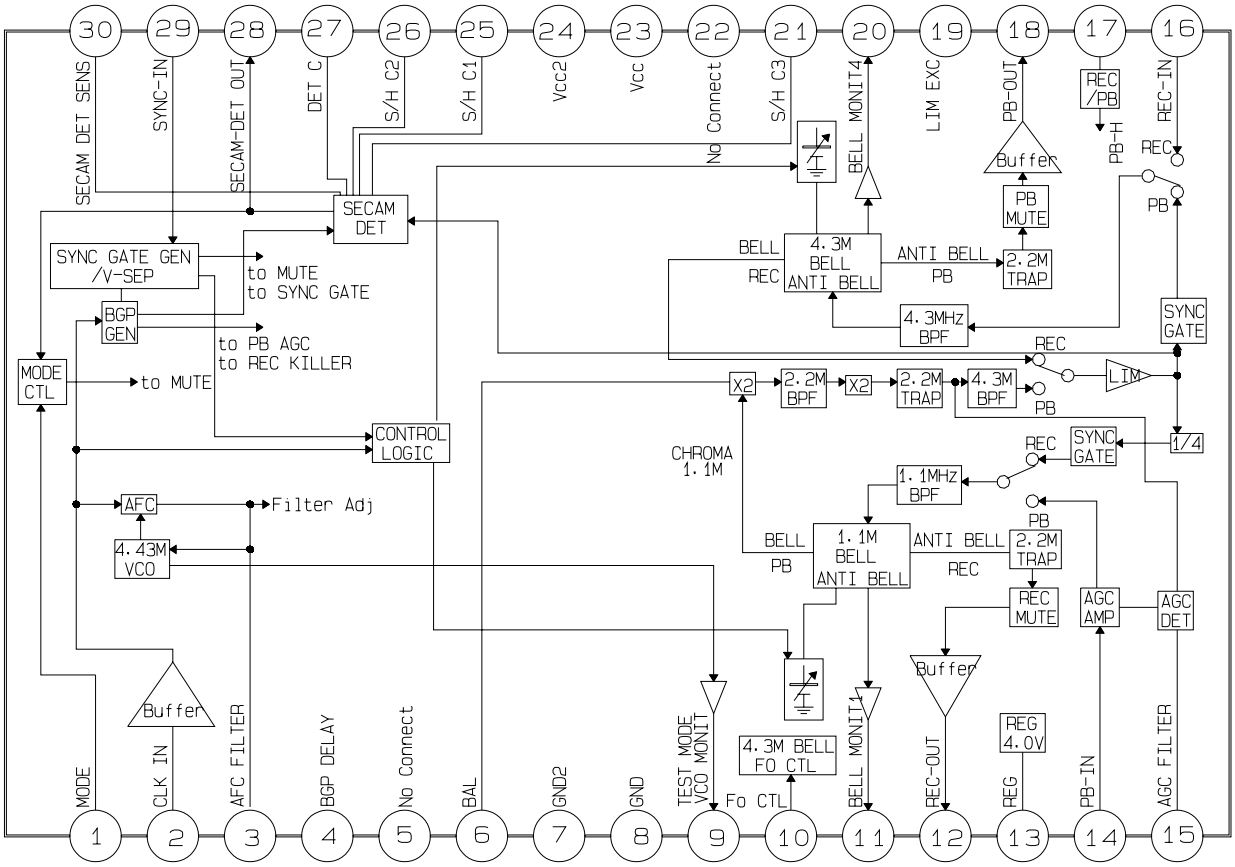


Fig. 7-38 LA70100M Block Diagram

7-11 Input-Output

The output signal of DVD and VCR are inputted to IC802.
Because has no copy function.
The output signals are detemined by only IC802.

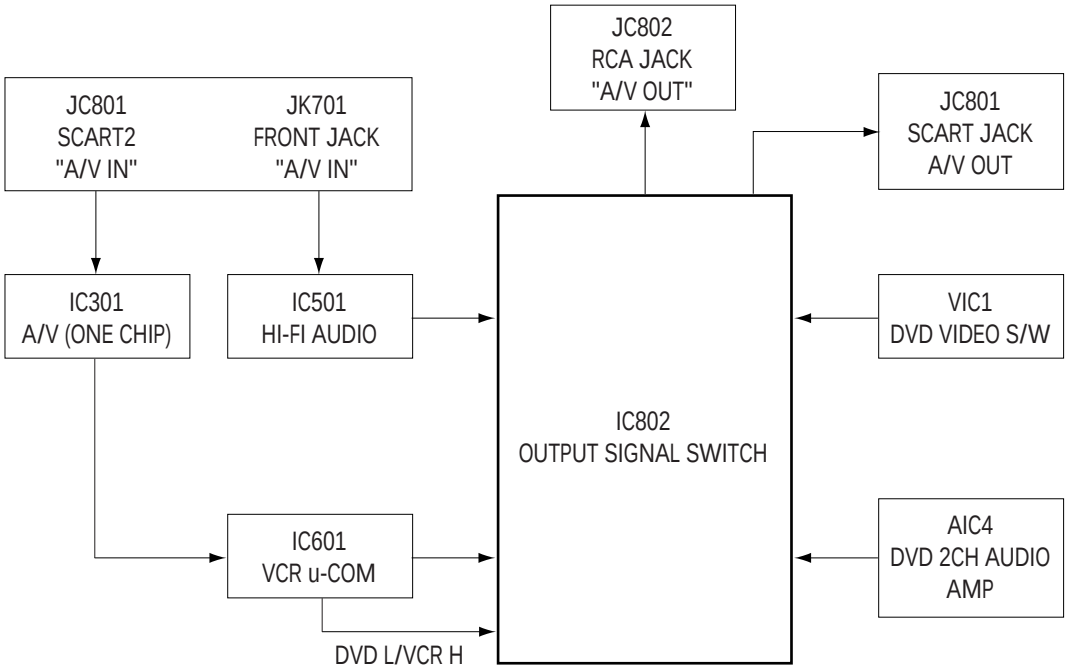


Fig. 7-39 Block Diagram

Table 4 : Output Signal Switching Condition

Block	Input Signal		Input Pin	Output Signal	Output Pin	9, 10, 11 CTL Level	Output Signal Type
VCR	Video		Pin 13	Video	Pin 14	High	VCR Video
	Audio	L	Pin 1			Low	DVD Video
		R	Pin 3	Audio L	Pin 15	High	VCR Audio L
DVD	Video		Pin 12			Low	DVD Audio L
	Audio	L	Pin 2	Audio R	Pin 4	High	VCR Audio R
		R	Pin 5			Low	DVD Audio R

7-12 DVD System Control

(1) Outline

The main micom circuit is composed of IM flash memory (DIC2) to bosting system and data saving, 64bit SDRAM (DIC5) for temporary data read and write
The Micom (U1,ES6629) mounted in main board analizes the key commands of front panel or instructions of remote control through communication with Micom (IC601) MPD790006GF of VCR an d controls the devices on board to execute the corresponding commands after initializing the devices connected with micom on board at power on.

(2) Block Diagram

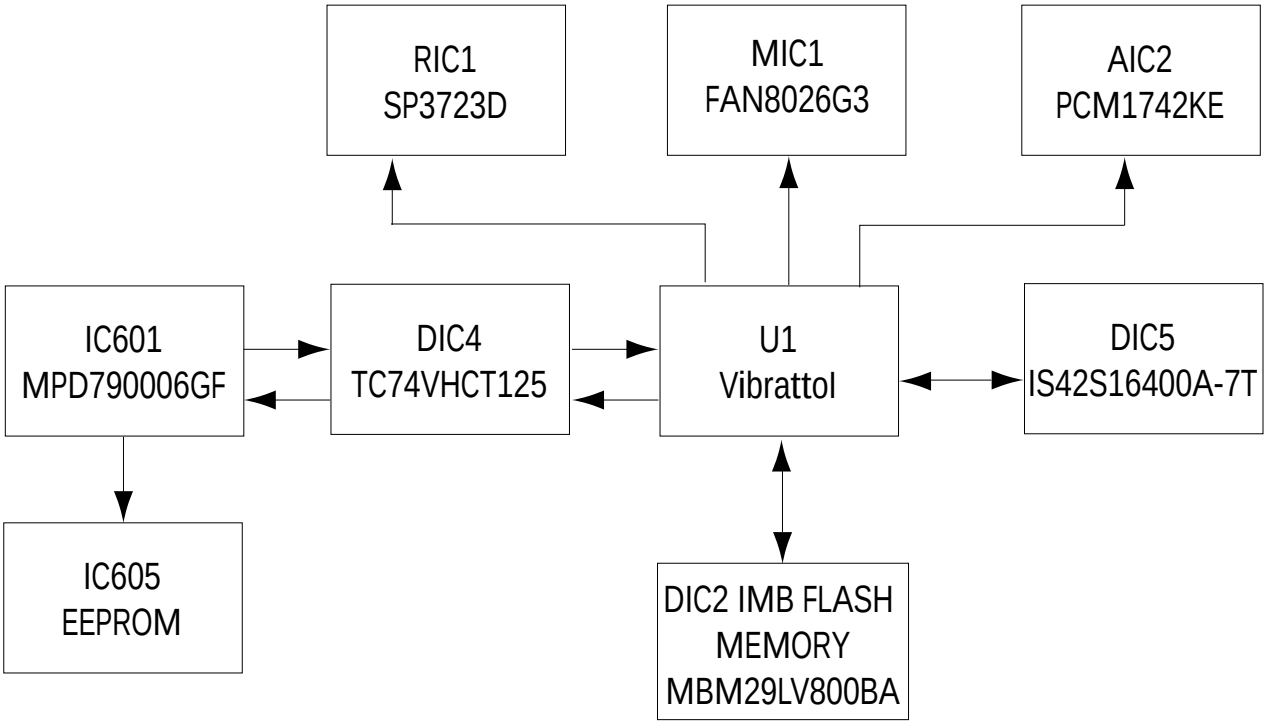


Fig. 7-40

7-13 DVD RF

(1) RIC1 (SP3723D)

The main furction of this IC is control the DVD RF signal by eolualiziny.
This IC has a favction “(aser power control). This function makes a RF signal to grnerale a RF signal from pickoup by stable control. and the communicwtion with U1(main micom) make it distirguish the disc and check several signal ; tracking , detecl , etc...

(a) Basic

SP3723D 5V/3.3V and reference wltge1.5V.

(b) RF signal

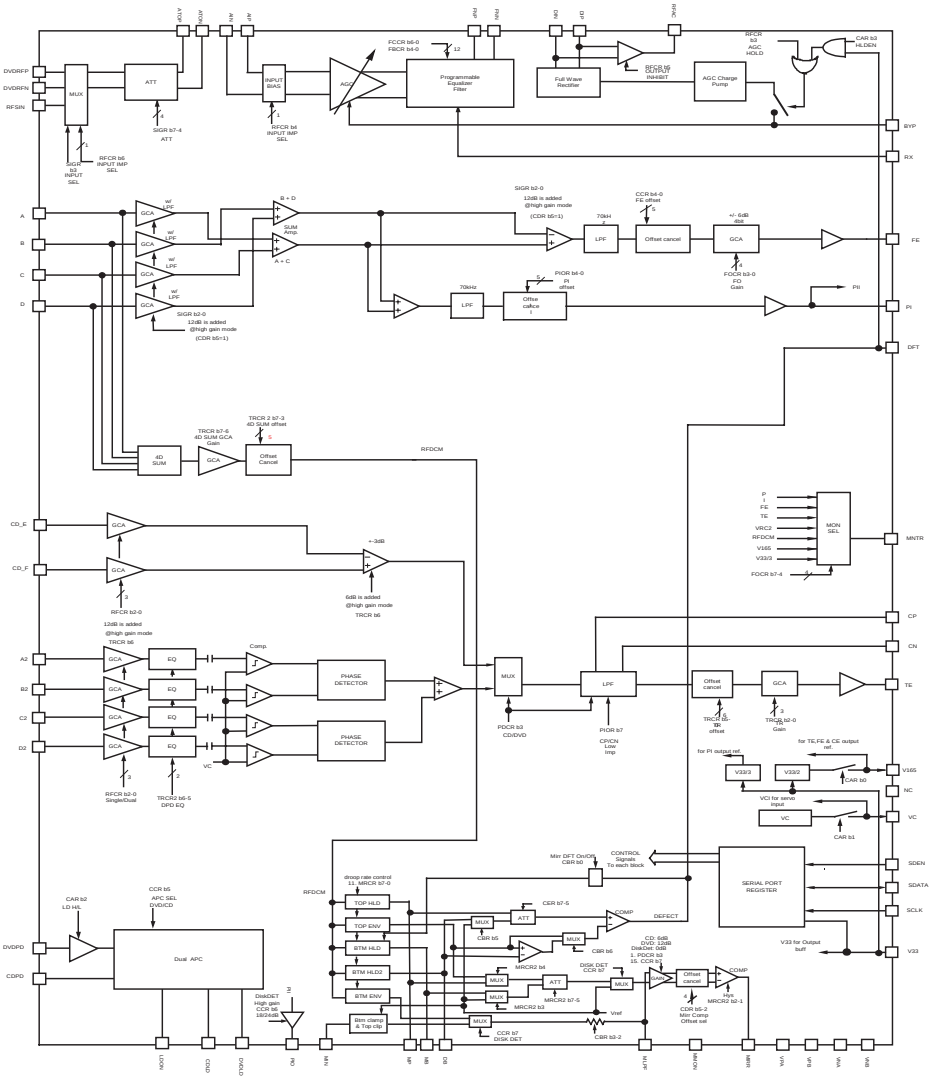


Fig. 7-41

This diagram shows the flow of signal generated by the pickup. A, B, C, D syrcls detected from pickup are converted in to RF syral (A+B+C+D) vid rf summing AMP.

7-14 DVD Servo

(1) Outline

SERVO system of DVD is Compoced of Focusing SERVO, Tracking SERVO, SLED and CLV SERVO (spindle motor servo)

1) Focusing SERVO : Focuses the optical spot output from object lens onto the disc surface. Maintains a uniform distance between object lens of Pick-up and disc (for surface vibration of disc).

2) Tracking SERVO : Make the object lens follow the disc track in use of tracking error signal (created from Pick-up).

3) SLED Linked SERVO : When the tracking actuator inclines outwardly as the object lens follows the track during play, the SLED motor moves slightly (and counteracts the incline).

4) CLV SERVO (DISC Motor Control SERVO) : Controls the disc motor to maintain a constant linear velocity (necessary for RF signal).

(2) Block Diagram

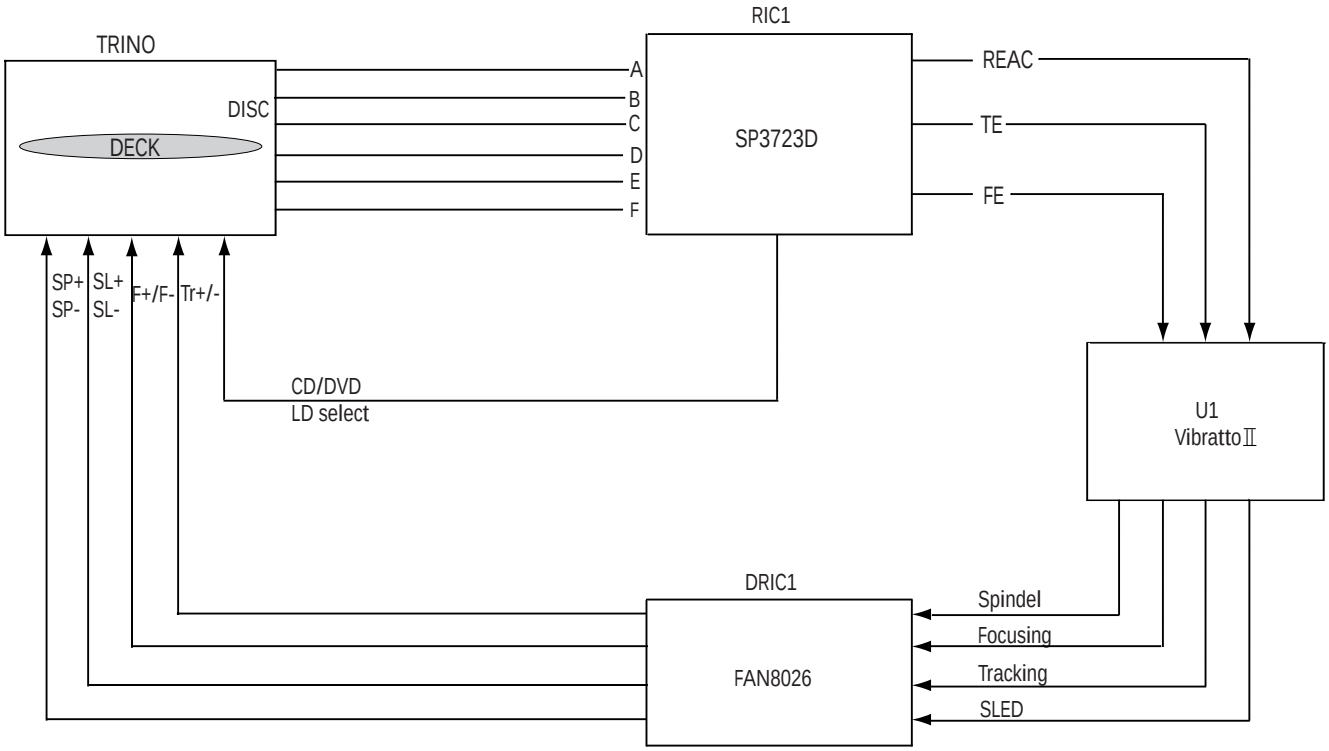


Fig. 7-42

(3) Operation

1) FOCUSING SERVO

(a) Focus Input

The focus loop is changed from open loop to closed loop, and the triangular waveform moves the object lens up and down (at pin 172 of U1 during Focus SERVO ON.) At that time, S curve is input to pin 142 of U1.

SBAD (pin 38 of RIC1) signal, summing signal of PD A, B, C, D, is generated, and zero cross(1.65V) point occurs when S curve is focused and SBAD signal exceeds a preset,constant value. The focus loop is changed to closed loop, and the object lens follows the disc movement, maintaining a constant distance from the disc. (these operations are same in CD and DVD).

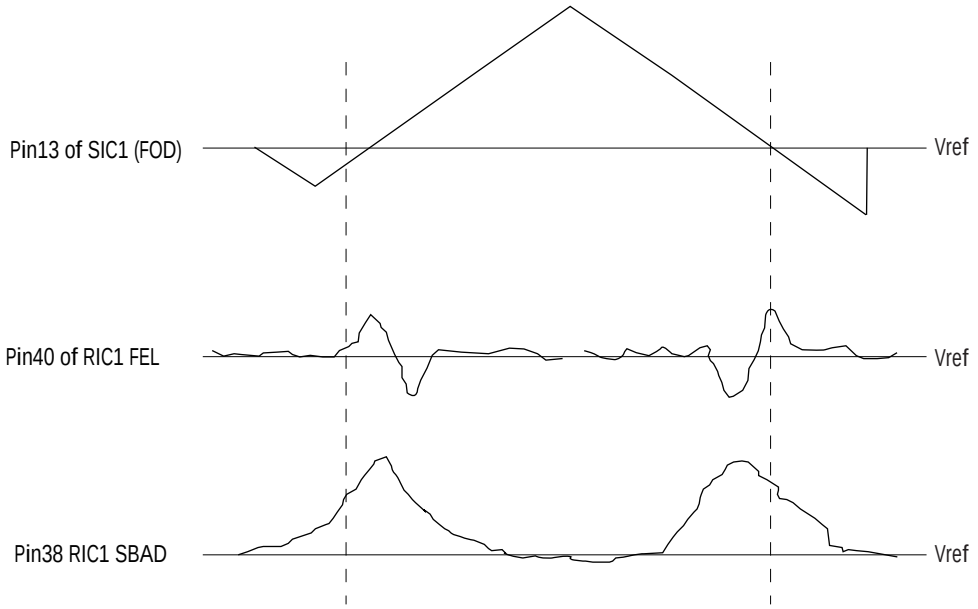


Fig. 7-43

(b) Play

When focus loop closes the loop during focus servo on, both pin 142 and pin of U1 are controlled by VREF voltage (approx. 1.5V), and pin 40 of RIC1 are approximately 1.5V.

2) TRACKING SERVO

A. NORMAL PLAY MODE

❶ For DVD
Composite : The signal output from PD A, B, C, D of Pick-up, the tracking error signal (pin39 of RIC1) uses the phase difference of A+C and B+D in RIC1, and inputs to terminal 139 of U1. Pin 139 of U1 is controlled by VREF(approx. 1.5V) during normal play.
Meanwhile, DVD repeats the track jump from 1 to 4 in inner direction at normal play (because data- read speed from disc is faster than data output speed on screen).

❷ For CD, VCD
Receive the signal output through E, F of Pick-up, from RIC1. The tracking error signal is similar to DVD.

B. SEARCH Mode :

Search mode : Fine seek,(Moving the tracking actuator slightly little below 255 track) and coarse search, moving much in use of sled motor. The coarse search will be described in sled linked servo and now, the fine seek is explained shortly.
If the object lens is located near target, cut off the tracking loop and give the control signal as many as desired count to move the tracking actuator via U1 pin 175 terminal(STRACK).

3) SLED LINKED SERVO

- Normal play mode
  Move SLED motor slightly by means of DA signal in U1 pin 174, as the tracking actuator moves along with track during play. Control to move the entire Pick-up as the tracking actuator moves.

- Coarse serach mode
  In case of long-distance search (such as chapter serach), U1 uses MIRR and signal of U146.
  Then, read ID and compute the existing track count after input of next track.
  If the existing track count is within fine seek range, tracking begins using fine seek.

4) CLV SERVO(DISC MOTOR CONTROL SERVO)

Input RF signal (from Pick-up) to U1 pin 154, 155
Detect SYNC signal from RF inU1, and output DA signal toU1 pin 171 for constant linear velocity.

7-15 DVD Data Processor

(1) Outline

IC601 resed the DVD main micom U1, by 5 line communication.
When the DVD system setup, micom and flash memry comunicate with each other and then DVD system is booted. After the flash set the system micomunicate with RIC1 and MIC1 by seqnence.
RIC1 set the servo and moving SLED, focclsing actuator to check the disc. now the DVD system is ready to opente

(2) Block Diagram

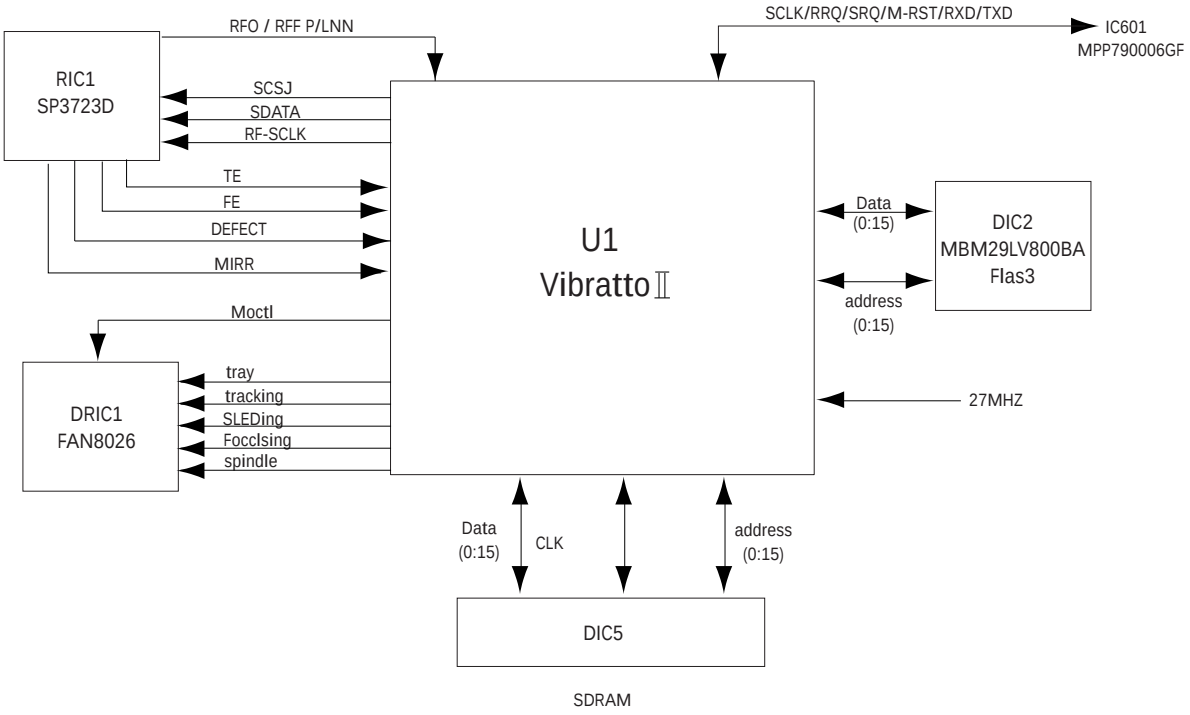


Fig. 7-44

7-16 DVD Video

(1) Outline

U1(A/V decoder with video encoder) diverges from the 27MHz crystal, then generates VSYNC and HSYNC.
U1(A/V decoder with video encoder) does RGB encoding, copy guard processing and D/A conversion of 8bit video data internally inputted from video decoder block by Micro Process block.
Video signal converted into analog signal is outputted via amplifier of analog part.

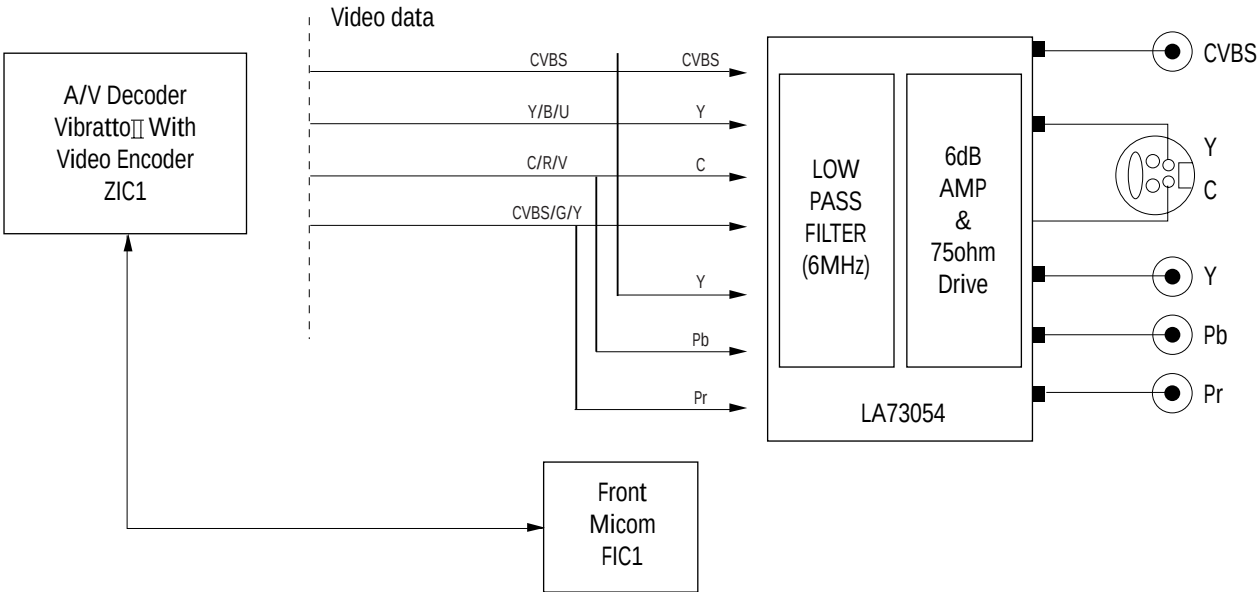


Fig. 7-45 Video Output Block Diagram

(2) NTSC/PAL Digital Encoder (VADDIS 5E ; Built in video encode)

U1 inputted from pin 2 with 27MHz generates HSYNC and VSYNC which are based on video signal.
U1 is synchronous signals with decoded video signal and control the output timing of 8bit video signal of ITU-R601 format. The separate signal is encoded to NTSC/PAL by control of IC601.
The above signals, which are CVBS (Composite Video Burst Synchronized)/G (GREEN)/Y [PIN139], Y (S_VIDEO)/B (BRUE)/Pb[PIN145] and C (S_VIDEO)/R (RED)/Pr [PIN151], are selectively outputted CVBS +S_VIDEO, RGB/Component by the rear switch. In Course of encoding, 8bit data can extend to 10bit or more. To convert the extended data to quantization noise as possible, U1 adopts 10bit D/A converter.
U1 perform video en-coding as well as copy protection.

(3) Amplifier (VIC1: LA73054)

VIC1 is 6dB amplifier.
Based on CVBS signal, the final output level must be 2Vpp without 75ohm terminal resitance.
Because the level of video encoder output is only 1.1Vpp, the level is adjusted with the special amplifier.
When mute of pin 5 is high active, if the pin is floating and connecte to power, the output signal is never ouputted.
CVBS, Y, C, R, Pb(B), Pr(R) outputted from video encoder are inputted to VIC1 (Pin 2, 8, 6, 16, 14).
The signal to which gain is adjusted by amplifier is outputted from jack via 75ohm Resistance (VR2~VR11).

7-17 DVD Audio

(1) Outline

A/V decoder (U1 ; Vibratto[]) is supply to DATA 0 for 2-channel mixed audio output.
The audio data transmitted from A/V decoder (U1 ; Vibratto[]) are converted into analog signal via audio D/A converter and outputted via post filter and amplifier.
CD and VCD are outputted with only 2 channels audio data and transmit them to Data 0.
If DVD of multichannel Source disc, if is downmixed and transmit them to Data0.
If you want to listen to the multichannel output, you have to connect digital output with AC-3 amp or MPEG/DTS amp.

(2) Block Diagram

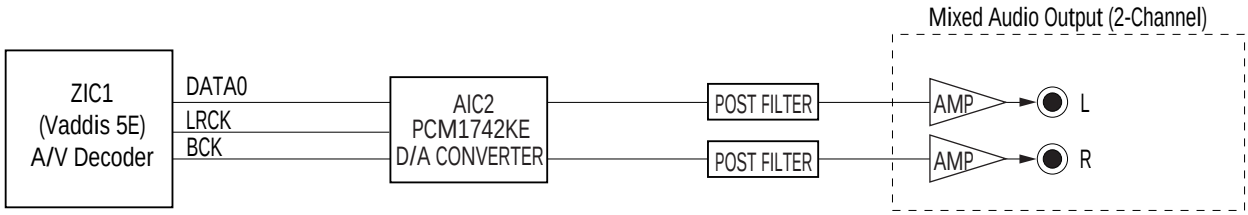


Fig. 7-46

(3) DVD Audio Output

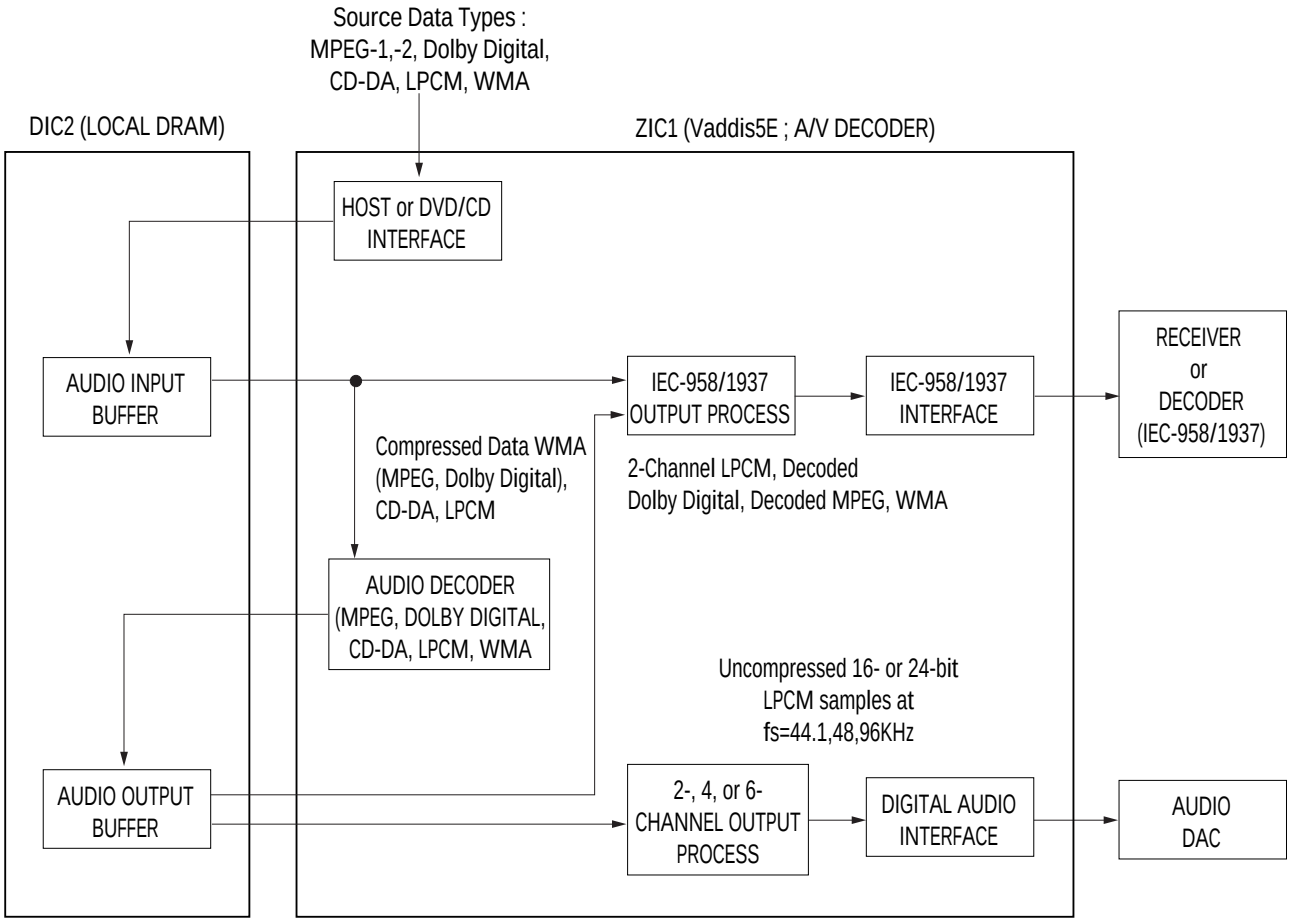


Fig. 7-47 Audio Decoder and Output Interface Datapath

1) Compressed Data

The audio data inputted to U1 (Vibratto∏) A/V decoder is divided into compressed data and uncompressed data. It is compressed data that is compressed with multi-channel audio data such as Dolby digital, MPEG, DTS, WMA,etc. The compressed data inputted to (Vibratto∏) is converted into the uncompressed data of 2, 4, and 6 channels through U1 built-in audio decoder and is outputted to Data 0 through digital audio interface. The compressed data is transmitted to external AC-3 amplifier or MPEG/DTS amplifier as IEC-958/1937 transmission data format compressed by U1 built-in IEC-958 output process.

2) Uncompressed Data

The uncompressed data is that data isn't compressed, so it is called CD-DA, LPCM data.
The 2 channels data is converted through audio decoder 2-channel data and Data 0 and are outputted in digital audio interface.Via IEC-958 output process, they is transmitted to digital amplifier or AC-3/MPEG/DTS amplifier built in the external digital input source with IEC-958/1937 transmission format.

MEMO

8. VCR Deck Operating Description

8-1 Features of Mechanism

The following items describe features of the mechanism in VCR.

(1) This VCR uses 3-motor system consisted of a cylinder motor, capstan motor, and loading motor.
A capstan motor is used to drive the reel and the driving force is transmitted throuch the belt capstan.
The cassette loading, tape loading, and mode shift operation are performed by the loading motor.

(2) The time duration from cassette-in to picture appearance is shortened by employing the loading drive mechanism (automatic transferring operation from the cassette loading to the tape loading by rotating the loading motor continuously), and by increasing the speed of the tape loading, etc

(3) Employment of the full loading system shortens time required to shift the mode such as STOP to PLAY-BACK picture display.

(4) To simplify wiring and others, the electrical components relating to operation of the mechanical deck, such as sensors, mode switch, servo microcomputer, etc. are mounted on the PCB arranged all over the bottom side of the mechanical deck.

8-2 Basic Configuration of Mechanism

As shown in Fig. 8-1, the mechanism of VCR is configured with five main blocks, and each operation is precisely controlled by the microcomputer built in the system control section.

First, load a video cassette tape in VCR :

(1) The cassette is automatically set on the reel disc.

(2) The tape is pulled out from the cassette, and wrapped around the cylinder.

(3) The cylinder turns in a constant speed rate synchronizing with the vertical Sync. signal of video signal.

(4) The tape runs in synchronization with cylinder rotation and traces the video tracks precisely.

(5) The running tape is taken up by the reel, the tape feeding side is given with a proper tension so that tape is not slacked.

The above series of operations are performed under control of the system control section. The system control section also sends commands to each mechanism according to the operation buttons, thus the VCR is designed so that various operations such as recording, playback, special playback, FPS / RPS, and FF / REW, etc. are correctly performed.

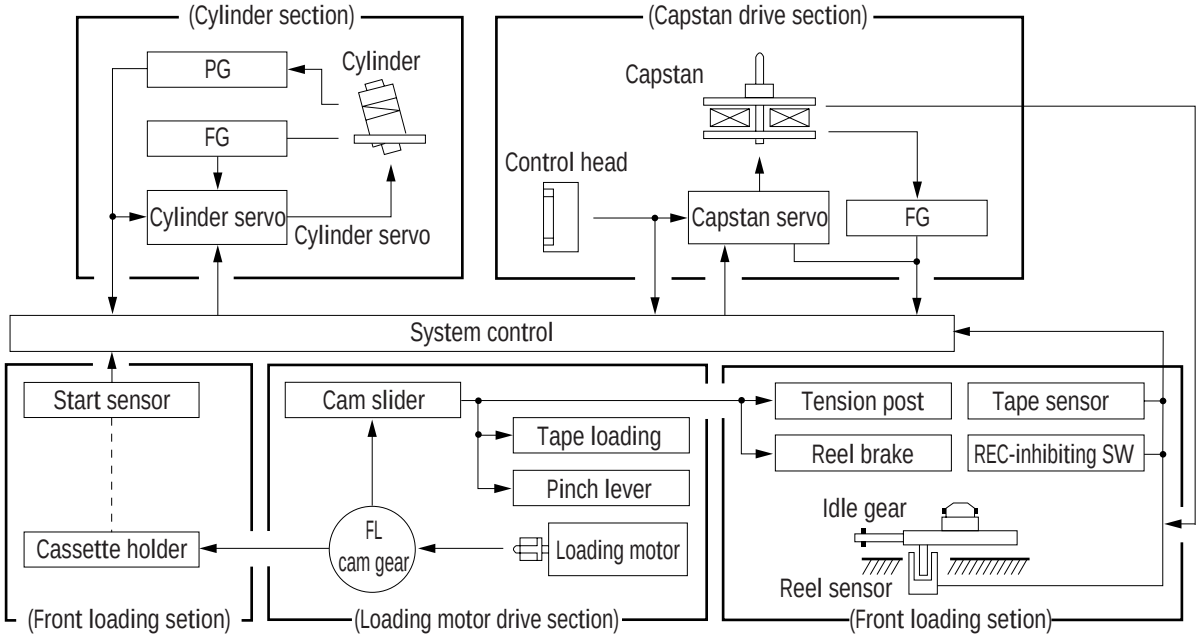


Fig. 8-1 Basic Configuration of Mechanism

8-3 Main Mechanism and Functions

8-3-1 Tape Path System

The tape come out from the supply reel (S) of the video cassette runs through paths shown in Figs. 8-2 and 8-3, and is taken up by the take-up (T) reel. (S stands for the supply reel, and T for the take-up reel, hereafter.)
At S reel side (tape enterance side of the cylinder) against the cylinder, a tension post to allow the tape surface to contact with each head with a proper tension which assures stable running, an FE head which erases entire data of the tape, and an S guide roller which restricts tape motion in upward / downward direction are provided.
In the same way, a T guide roller, audio head to record audio signals at upper side of the tape, control head to record and reproduce a control signal at lower side of the tape, and an audio erase head to erase only the audio signals and perform after-recording in parallel with the audio head are provided at T reel side. (tape exit side of the cylinder).
The guide parts marked with asterisks (*) are equipped with the adjusting mechanism to stabilize the tape running or to record and reproduce the signals precisely.

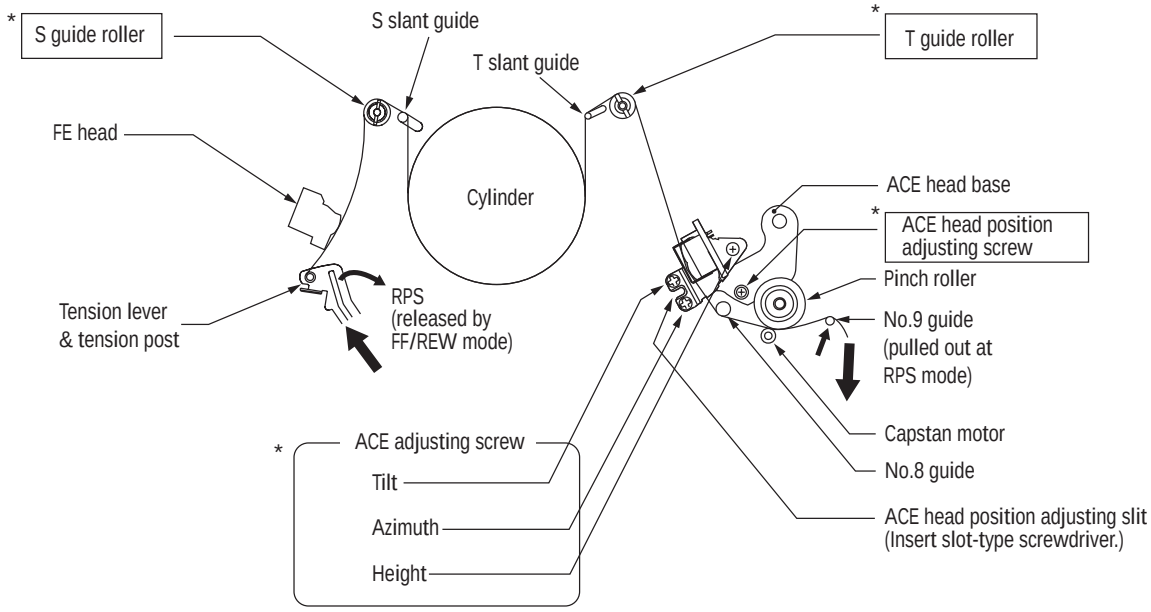


Fig. 8-2 Tape Path System

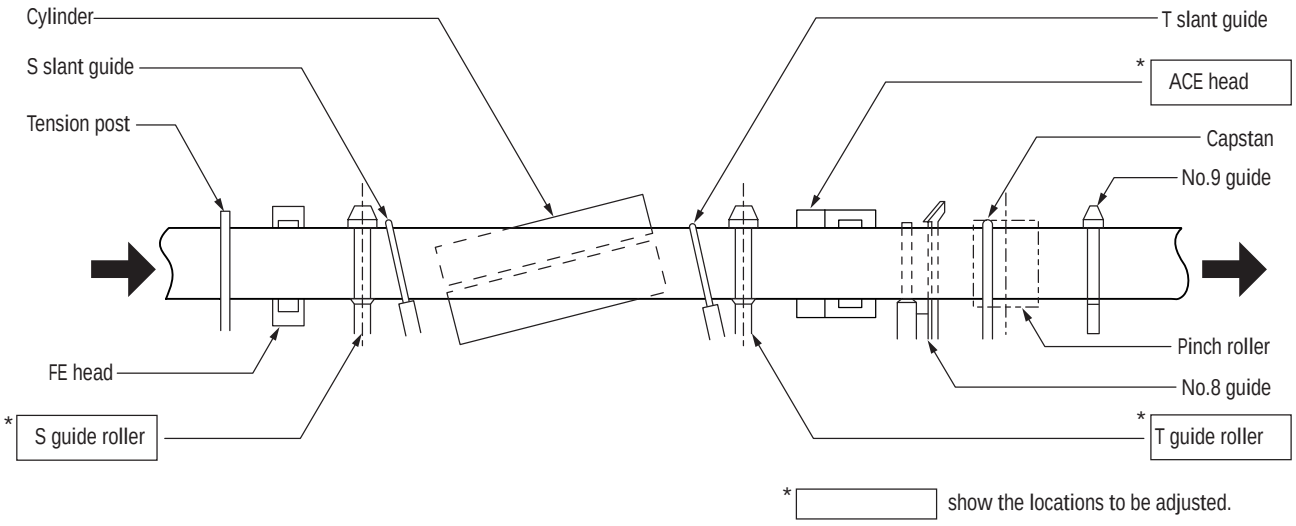


Fig. 8-3 Guide Path System

8-3-2 Reel Drive System

The reel drive system consists of a capstan motor as a drive power source, belt as a power transmission mechanism, clutch mechanism, idle gears, and a reel disc. Selecting of forward rotation or reverse rotation is carried out by an idle gear which changes its rotating direction according to rotating direction of the clutch holder.
Reel take-up torque is selected according to an operation mode.
In the record, playback, fps, rps modes, the reel take-up torque is controlled by the clutch mechanism, thereby the tape fed by the capstan is taken up with a proper torque.
In the FF and REW modes, the clutch enters a direct connecting status in which the clutch mechanism does not operate and the capstan drive torque is transmitted without reduction, so a high speed taking-up is enabled.

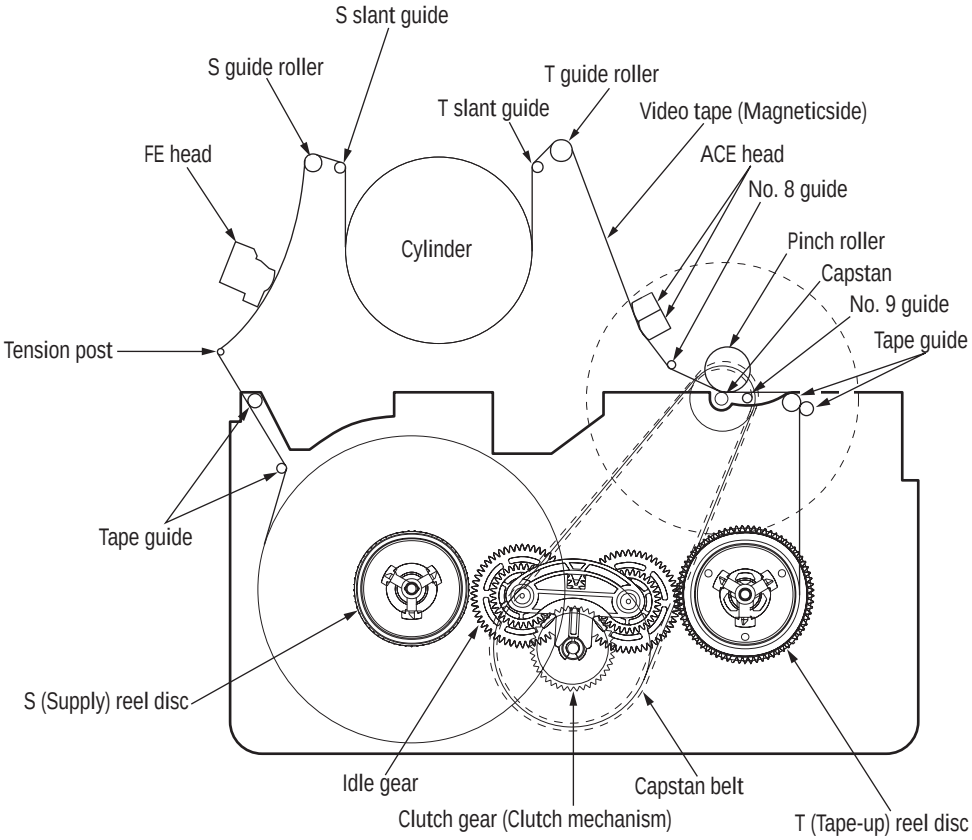


Fig. 8-4 Reel Drive System

8-4 Basis of the Mechanism

8-4-1 Front Loading

(1) When a video cassette is inserted into the cassette holder and pushed furthermore, FL arm lever is rotated by motion of the cassette holder. The rotation of FL arm lever makes the horizontal moving of FL drive slider.
(2) When the information of Start Sensor OFF is transmitted to the microcomputer, the loading motor starts to rotate.
(3) The rotation is transmitted in a sequence shown below :
Loading motor - worm gear - worm wheel - FL Cam Gear - FL Drive Slider - FL Arm Lever - Cassette Holder
(4) The video cassette is horizontally moved.
(5) The cassette tape is vertically moved.
In this case, the cassette lid is opened.
(6) The cassette tape is set on the reel disc, and loading operation completes.
(7) The cassette tape is loaded.
(8) The status becomes full loading.
(9) When the cassette is out, the reverse steps of the above procedure are carried out.

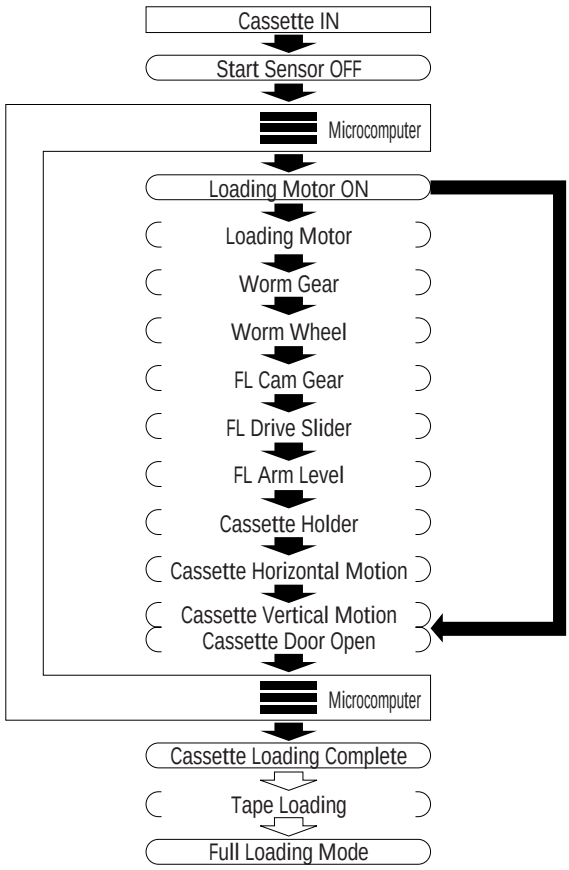


Fig. 8-5

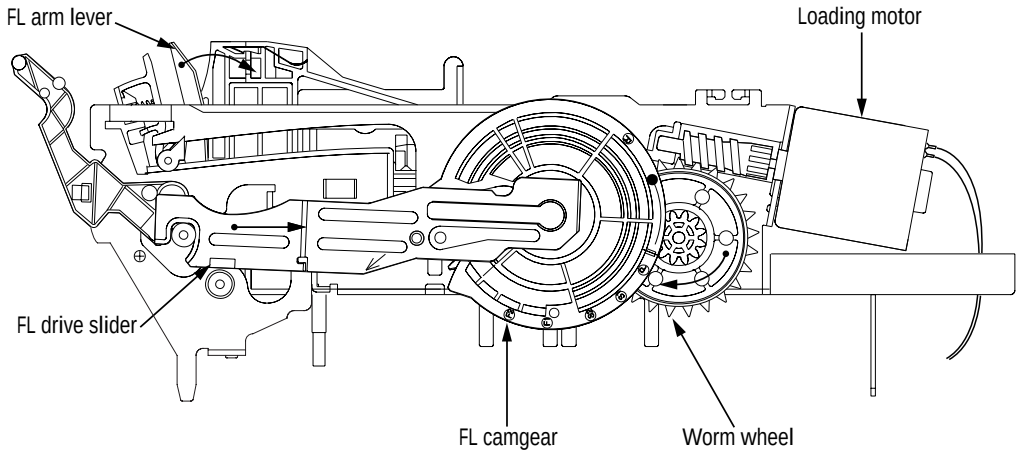


Fig. 8-6 Drive Transmission Path

8-4-2 Cassette loading/unloading Modes

When a cassette is entered in the VCR, the cassette is set on the reel disc by the front loading mechanism.
In this case, the tension post, loading tape guide, capstan motor, and the No.9 guide are positioned inside of the tape in the cassette case.

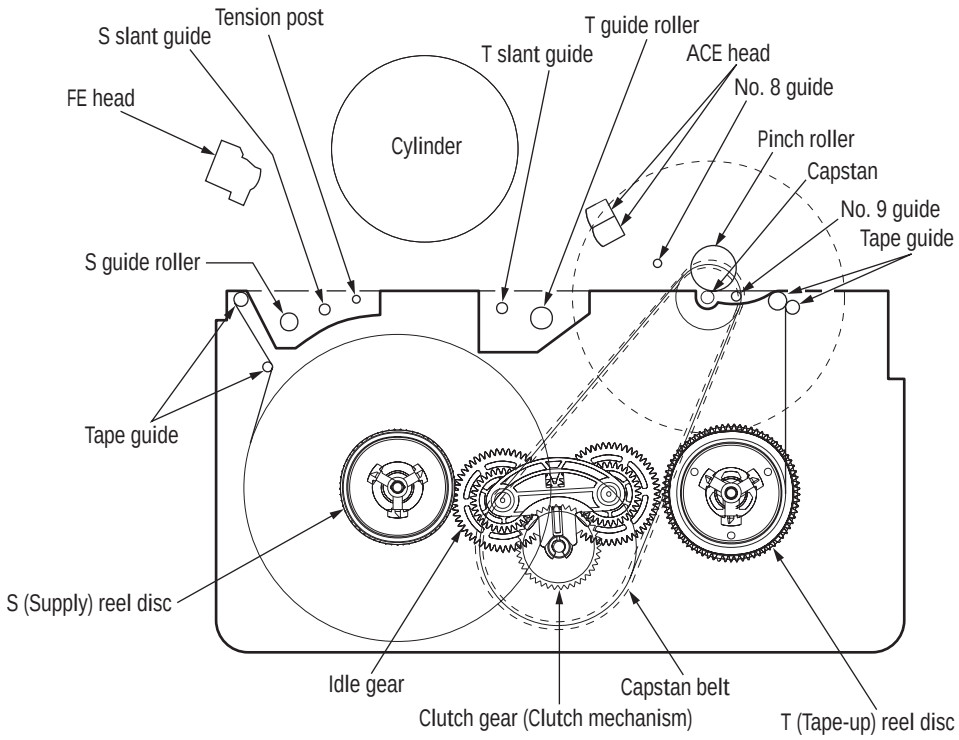


Fig. 8-7 Cassette IN/OUT Mode

8-4-3 Tape Loading

A full loading system is employed.
In the full loading system, the tape loading starts at the same time when the cassette loading operation has completed and cassette has been mounted, and the tape is pulled out, wrapped around the cylinder and the mechanism enters the stop status under this condition.

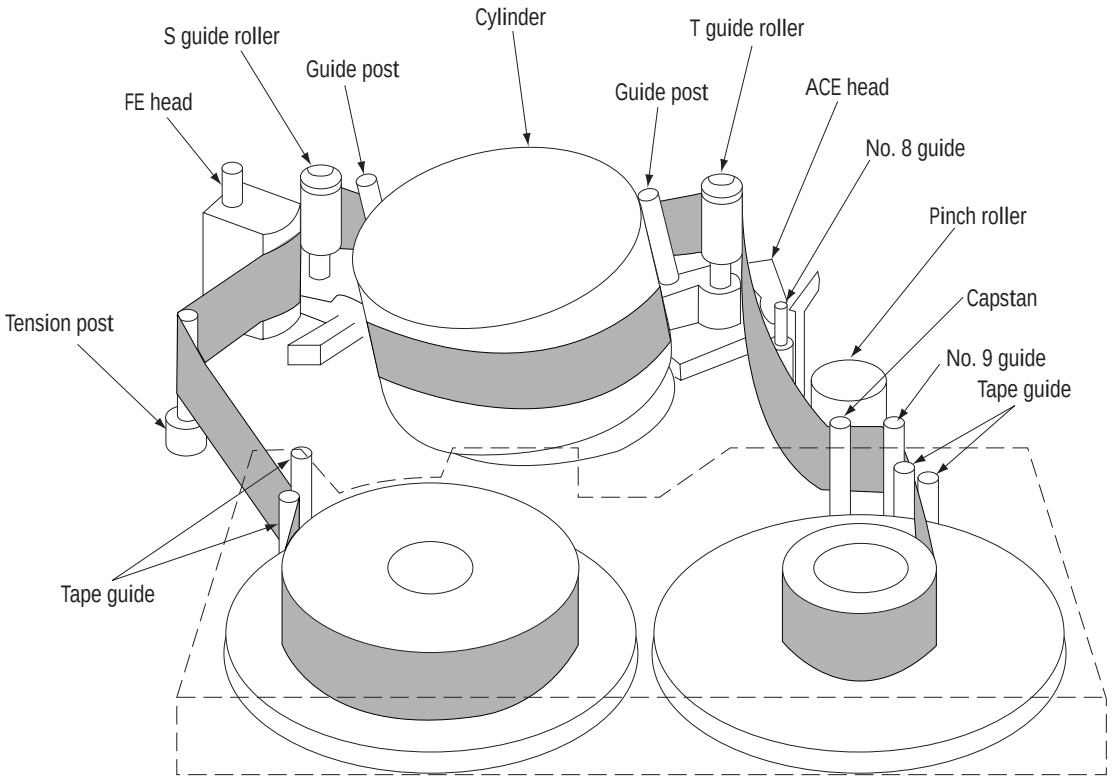


Fig. 8-8 Tape Loading

8-4-4 Playback Standby Mode

In the full loading system, the tape loading starts at the same time when the cassette mounting has completed, the mechanism shifts to the playback position, and enters the standby status with keeping tape wrapped around the cylinder.
In this case, tape tension applied to the cylinder is decreased to protect the tape and to prevent the tape from scratches.

8-4-5 FF/REW Modes

The reels enter a free status by rotating the loading motor to go to FF/REW position.
In this case, the capstan motor rotates in colck-wise direction in the REW mode. The idle gear is swung rightward or leftward according to the rotating direction of the capstan motor. As a result, the T reel rotates in the FF mode or the S reel rotates in the REW mode, thus taking up the tape to the rotating reel.

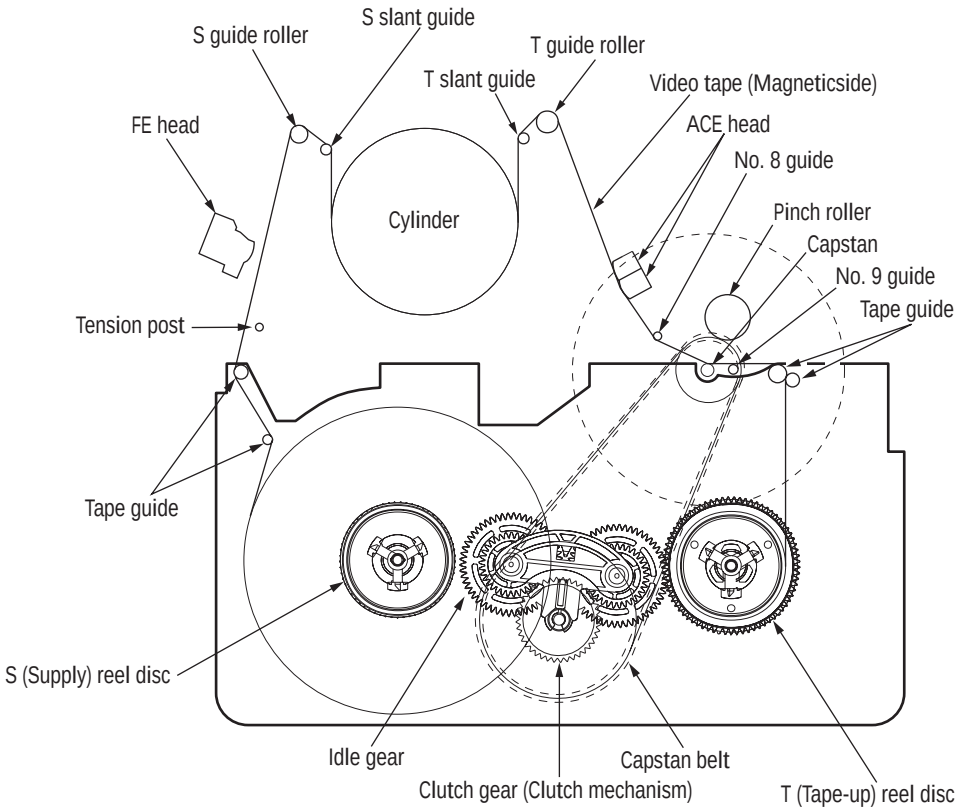


Fig. 8-9 FF/REW Mode

8-4-6 Record/Playback Modes

When the record or playback button is pressed, the tape is fed by the rotation of the capstan motor.
In this case, a tension post touches the tape and braking froces created by the band brake linked with the tension post is applied to the S reel, thereby stabilizing the tape tension. The tape fed by the capstan is taken up around the T reel. The T reel is driven with a constant torque generated by transmitting rotation of the capstan motor to the clutch mechanism.

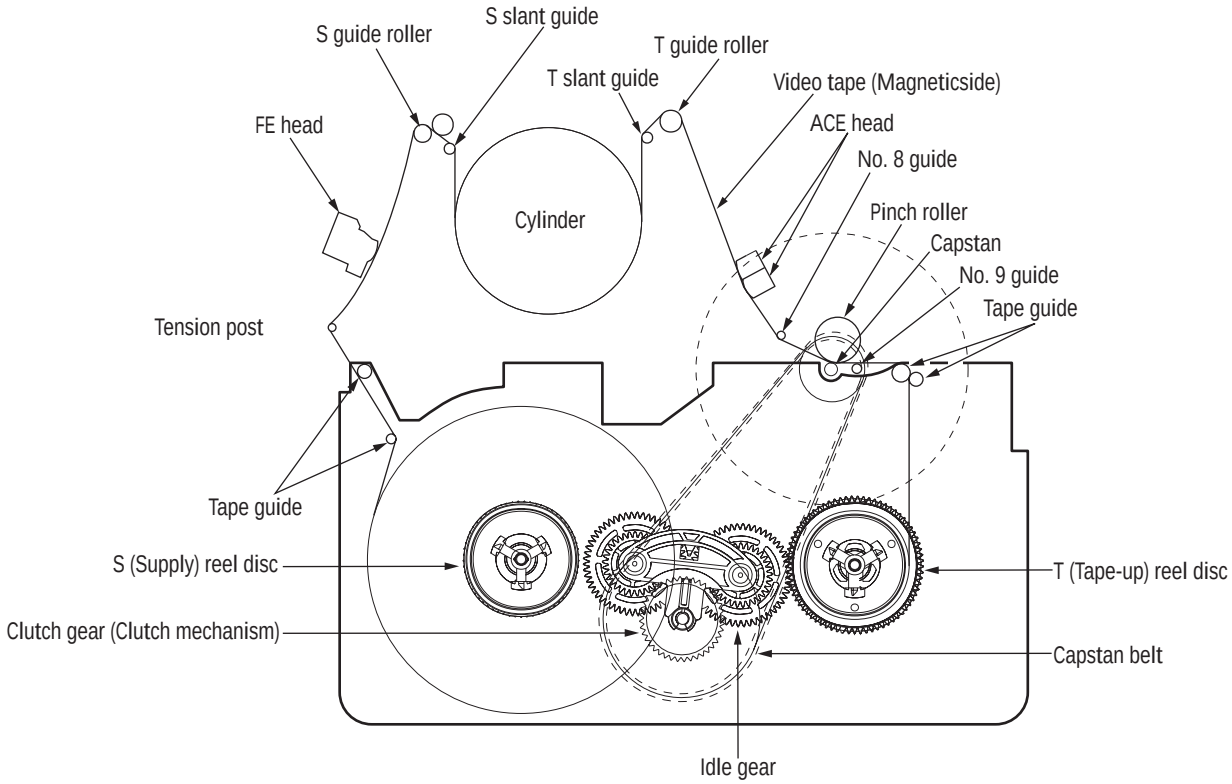


Fig. 8-10 Record/Playback Mode

8-5 System Control

In the VCR, complex mechanism, video, audio, servo circuits, etc. must be operated in specified timings matched each other. The system control circuit performs entire controls for the VCR.
An automatic stop function is also provided to protect important tape if a trouble occurs on the complex mechanism and the electrical circuits.
For this purpose, status of each part of the mechanism is always monitored with various sensor switches, and the microcomputer controls collectively the unit so that the best condition is kept.
Moreover, the microcomputer controls signal switchings for each circuit according to the mechanism status.

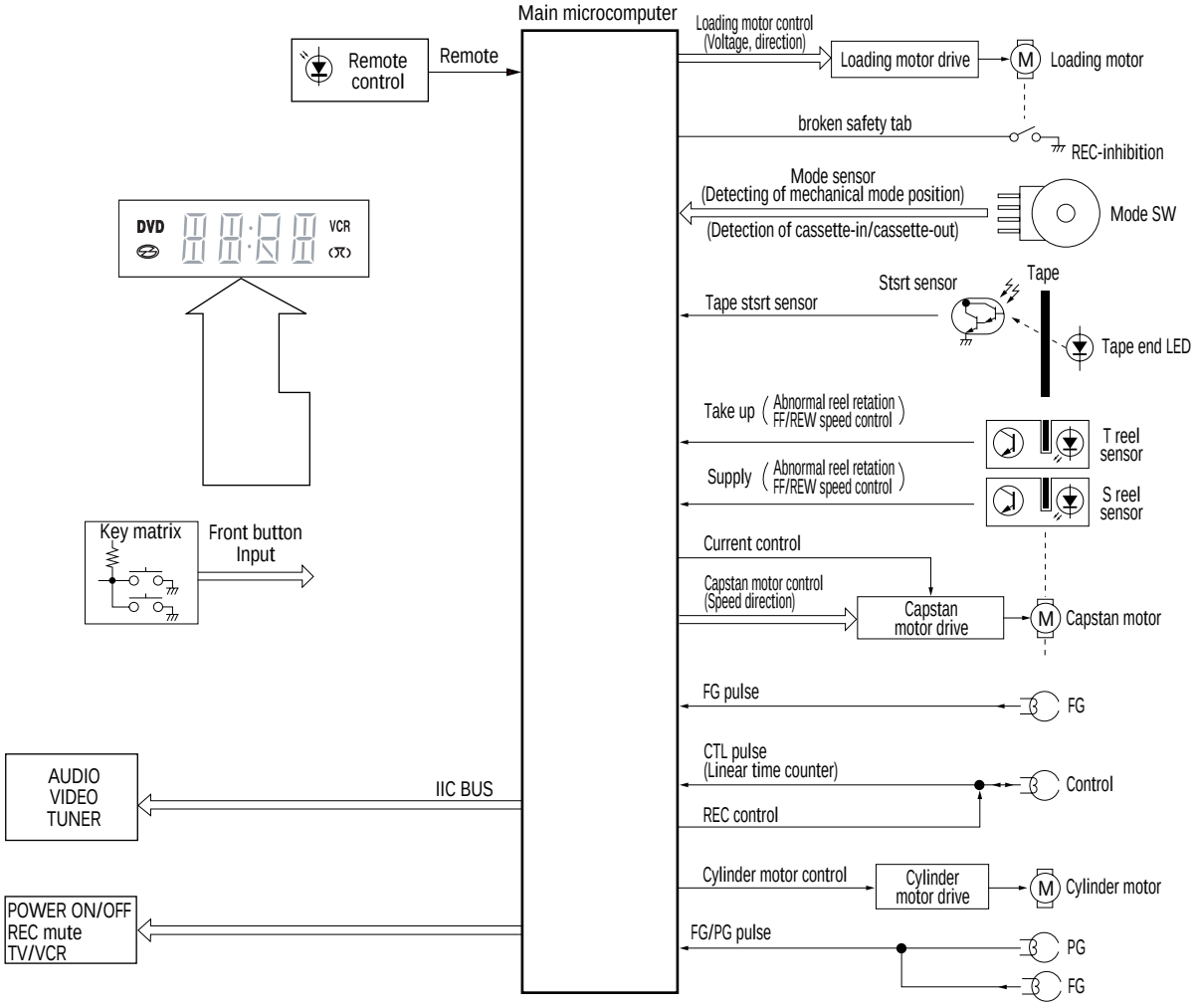


Fig. 8-11 System Control Block Diagram

8-6 System Control and Mechanical Operations

8-6-1 Mechanical Operation

The operation of mechanism is performed by rotation of the loading motor, and the transmission path of the operation is as shown in Fig. 8-12.

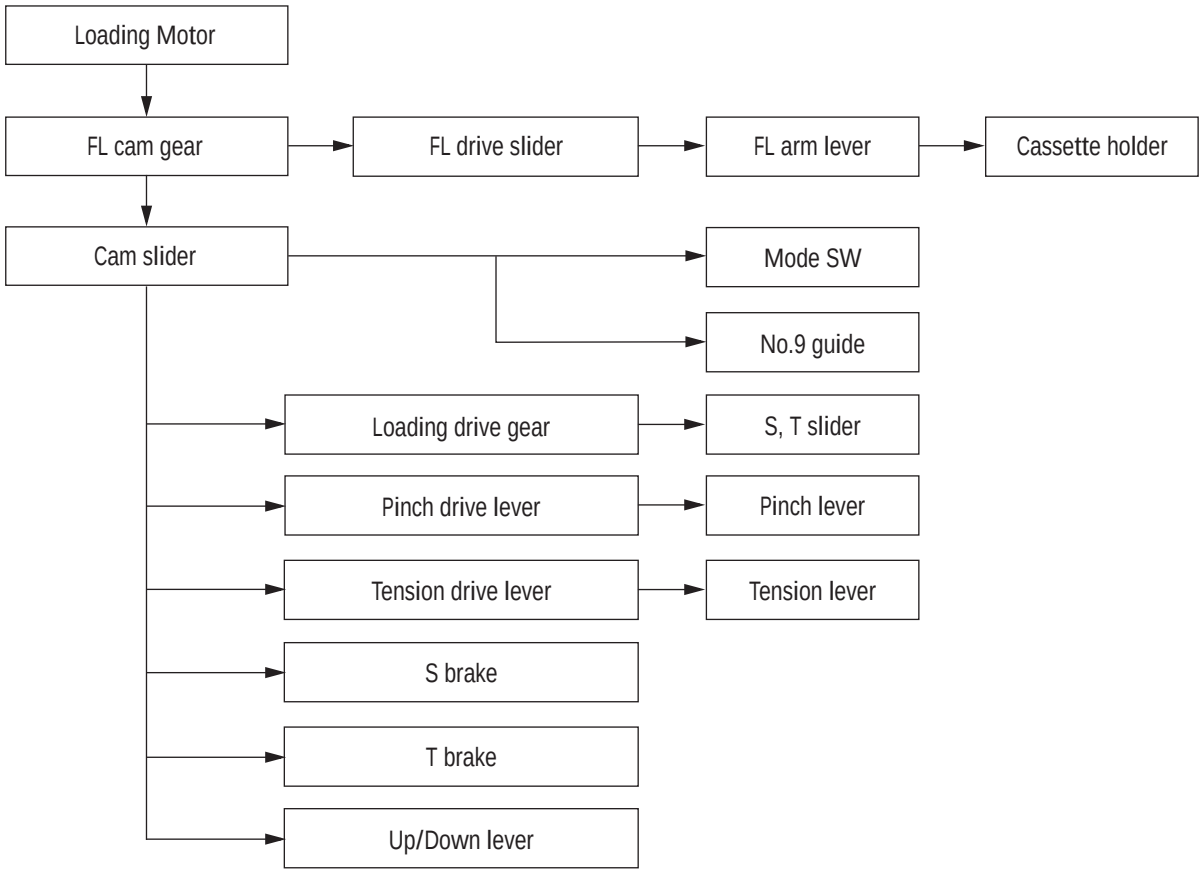
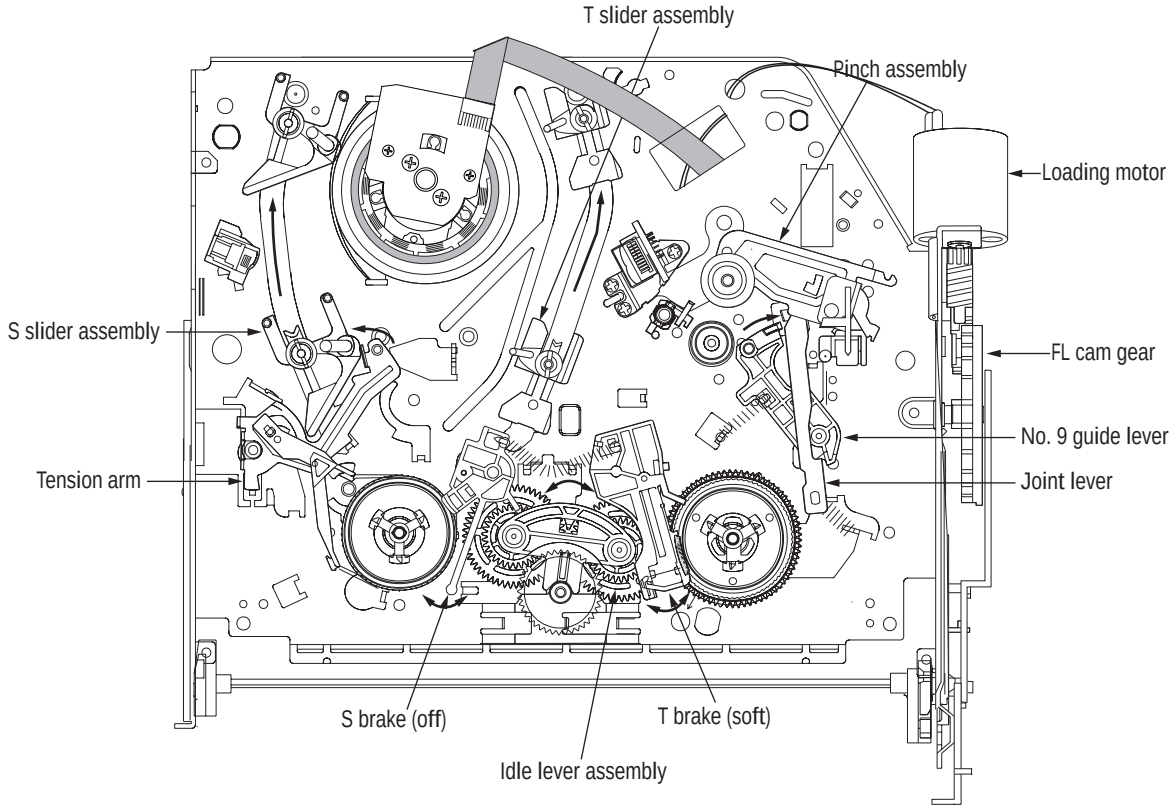


Fig. 8-12 Transmission Path of Operation

Fig. 8-14 shows each mode and mechanism status in each mode concerned with the rotation of the FL cam gear or cam slider shift. The mechanism operates as shown in Fig. 8-13 according to the timing chart in Fig. 8-14.

Note :
The Start Sensor is actuated by the horizontal moving of Slider FL Drive and turned on or off by insertion or ejection of a cassette.

<Top View>



<Bottom View>

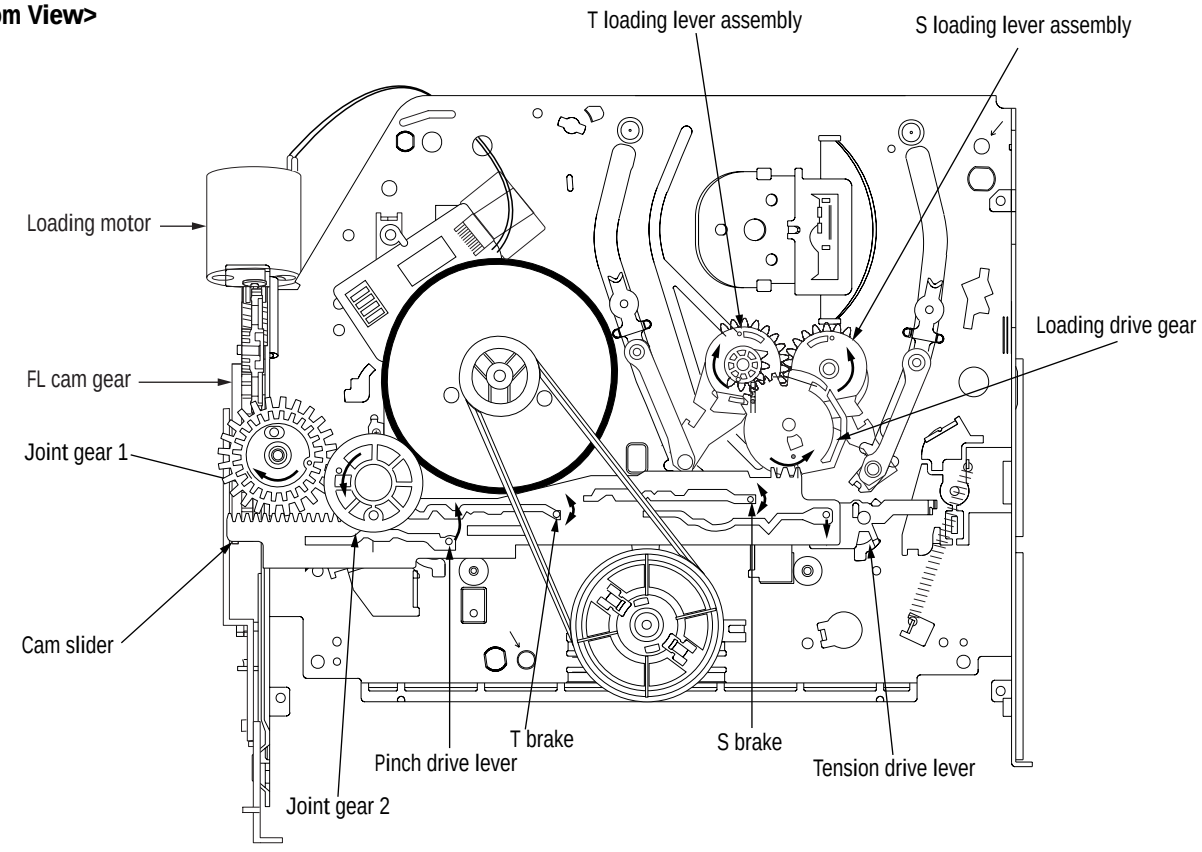


Fig. 8-13 Mechanical Operation

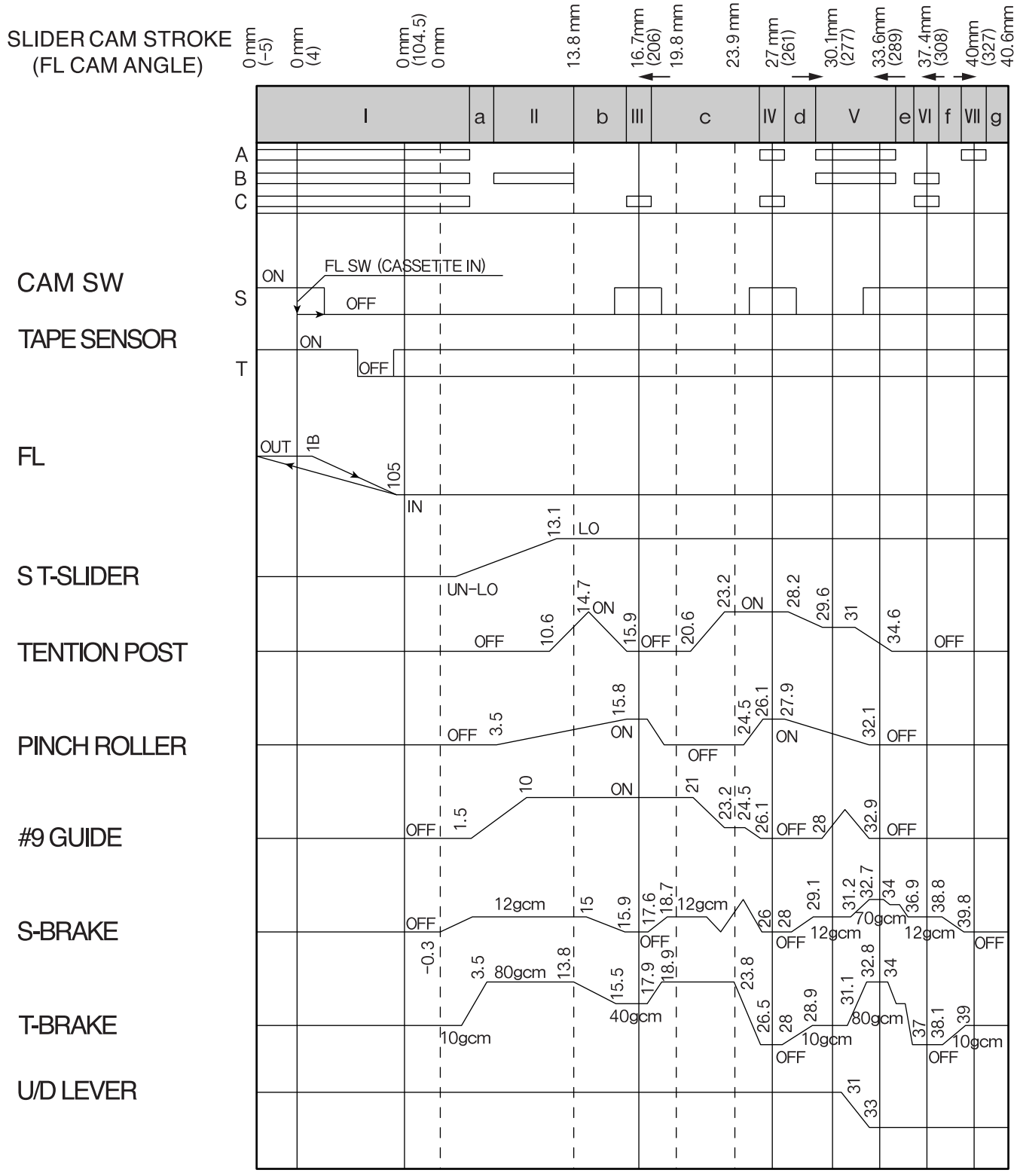


Fig. 8-14 Mecha Timing Chart

(1) There are two STOP modes and two FF/REW modes.

1) STOP 1
This mode is performed when PB and FF/REW is not done for 5 miniute at power on.
The small load is given to S REEL DISC and T REEL DISC. And the cylinder motor is stopped.

2) STOP 2
This mode is performed when you press the stop button as performing FF/REW.
The large load is given to S REEL DISC and T REEL DISC.

3) FF/REW 1
This mode is performed when
❶ The tape load is small during performing FF and reducing speed.
❷ The tape load is large during performing REW.
The small load is given to S REEL DISK and no load is given to T REEL DISC.

4) FF/REW 2
This mode is performed when
❶ The tape load is large during performing FF.
❷ The tape load is small during performing REW and reducing speed
No load is given to S REEL DISK and the small load is given to T REEL DISK.

(Cf) According to acceleration, deceleration, and the location of tape, tension control which is caused by converting FF/REW 1 and FF/REW 2 each other is performed during FF or REW.

(2) The condition of S Brake and T Brake at each mode.

< S BRAKE>

1) OFF BRAKE (Unloading completion, RPS, PLAY, FF/REW 2)
- S BRAKE is detached from S REEL DISC completely. So S REEL DISC is free.

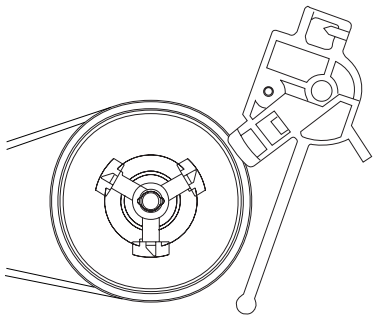


Fig. 8-15

2) SOFT BRAKE(during LOADING, STOP 1, FF/REW 1)
- The small load is given to S REEL DISC.

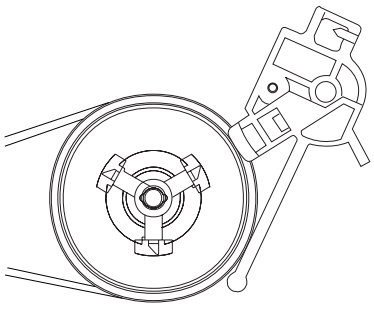


Fig. 8-16

3) MAIN BRAKE (STOP 2)
- The large load is given to S REEL DISC.

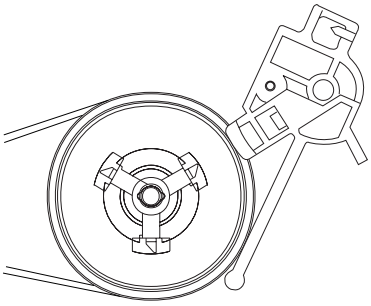


Fig. 8-17

< T BRAKE>
1) OFF BRAKE (PLAY, FF/REW 1)
- T BRAKE is detached from T REEL DISC completely. So T REEL DISC is free.

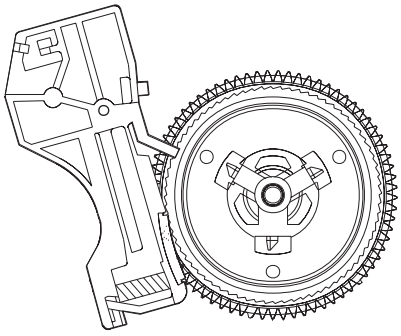


Fig. 8-18

2) SOFT BRAKE (UNLOADING Completion ,STOP 1, FF/REW 2)
- The small load is given to T REEL DISC.

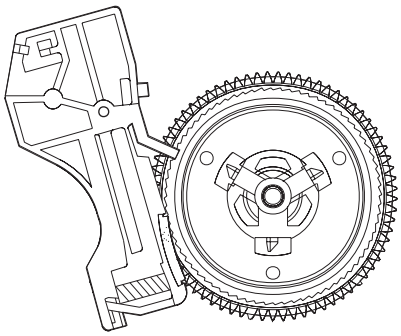


Fig. 8-19

3) REVERSE SEARCH BRAKE (RPS)
- The medium load is given to T REEL DISC.

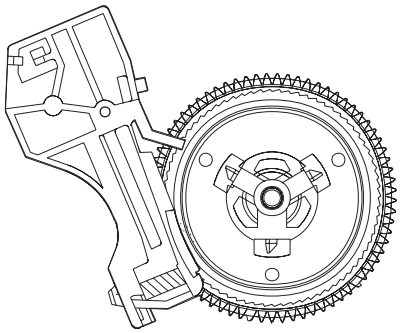


Fig. 8-20

4) MAIN BRAKE (on the loading, STOP 2)
- The large load is given to T REEL

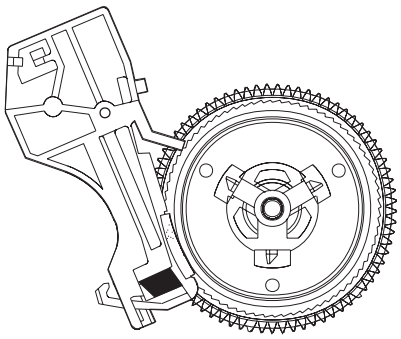


Fig. 8-21

8-6-2 Mode Sensor Drive

The mode sensor converts each mode of the mechanism into an electrical signal and transmits it to the microcomputer. The FL cam gear is rotated by the loading motor, and the cam slider slides after operation of the cassette holder.
Then the mode switch also rotates synchronized with the cam slider and outputs a signal corresponding to each mode. This signal is transmitted to the microcomputer and the microcomputer stops the cam slider at a specified angle, thus establishing each mode.
The IC601 controls Capstan Motor Drive IC for each mode to make the loading motor rotate in forward or reverse direction, thereby setting the mechanism at a specified position.
The mode switch develops three outputs A, B and C.
The circuit configuration of the mode sensor drive is shown in Fig. 8-22.

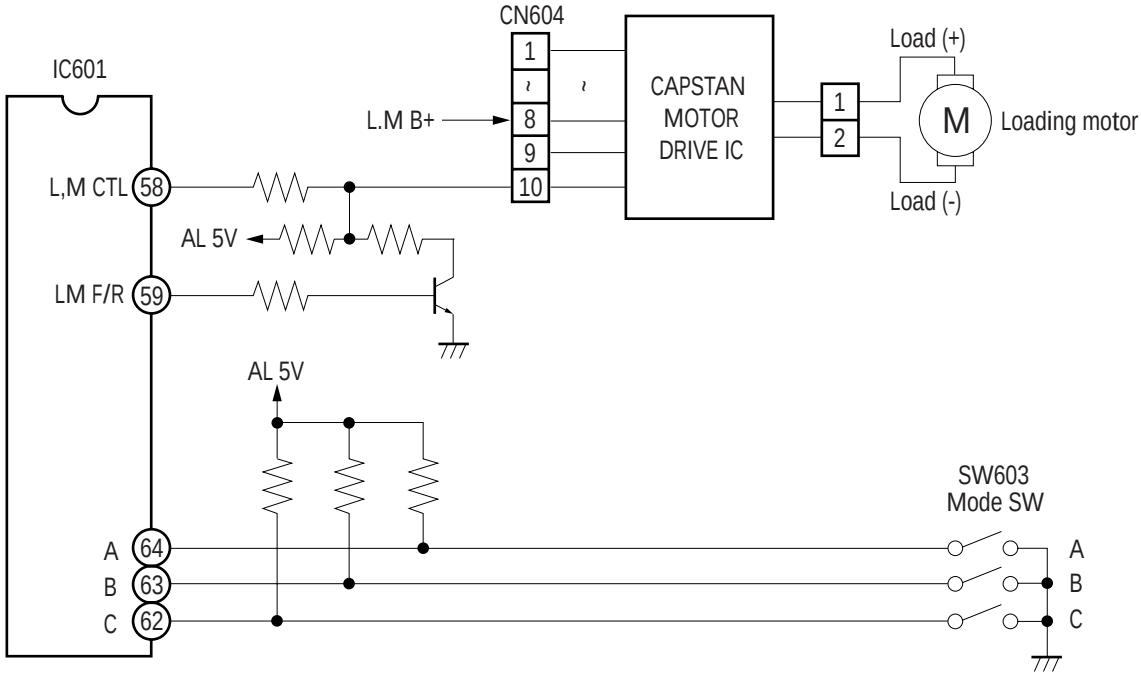


Fig. 8-22 Mode Sensor Drive

8-6-3 Operations in Each Mode

[1] Cassette loading & Tape loading mode

<Cassette loading>

(1) The FL cam gear is in the Cassette unloading (position I)position, and the cassette holder is in the out status (start sensor ON). Under this condition, each motor is stopped.

(2) Status of the mechanism is as follows.
   1) S.T guide rollers, tension post, No.9 guide are in unloading status and housed in the reel disc side.
   2) S brake is released and T brake is in soft brake status.
   3) The clutch holder assembly is in clutched status and idle lever assembly is enabled to be engaged with both S and T reel discs.

(3) When a cassette is inserted, the lock lever of cassette holder is released from the stopper, the cassette holder moves, the FL arm lever rotates, and the FL Drive Slider slides, thereby closing the start sensor.

(4) IC601 controls Capstan Motor Drive IC to rotate the loading motor in forward direction, and move the cassette holder. At the same time, the capstan motor rotates in the reverse direction and moves the cassette down (vertical motion) while rotating the S reel disc.

(5) The cassette lid opens when the vertical motion starts.

(6) When the vertical motion has completed and the cassette is mounted, the capstan motor rotates in the reverse direction. At that time the position “a” is detected with the cam slider shifted and the loading / capstan motors are stopped. After 300msec the loading motor rotates in the forward direction and enters the tape loading operation.

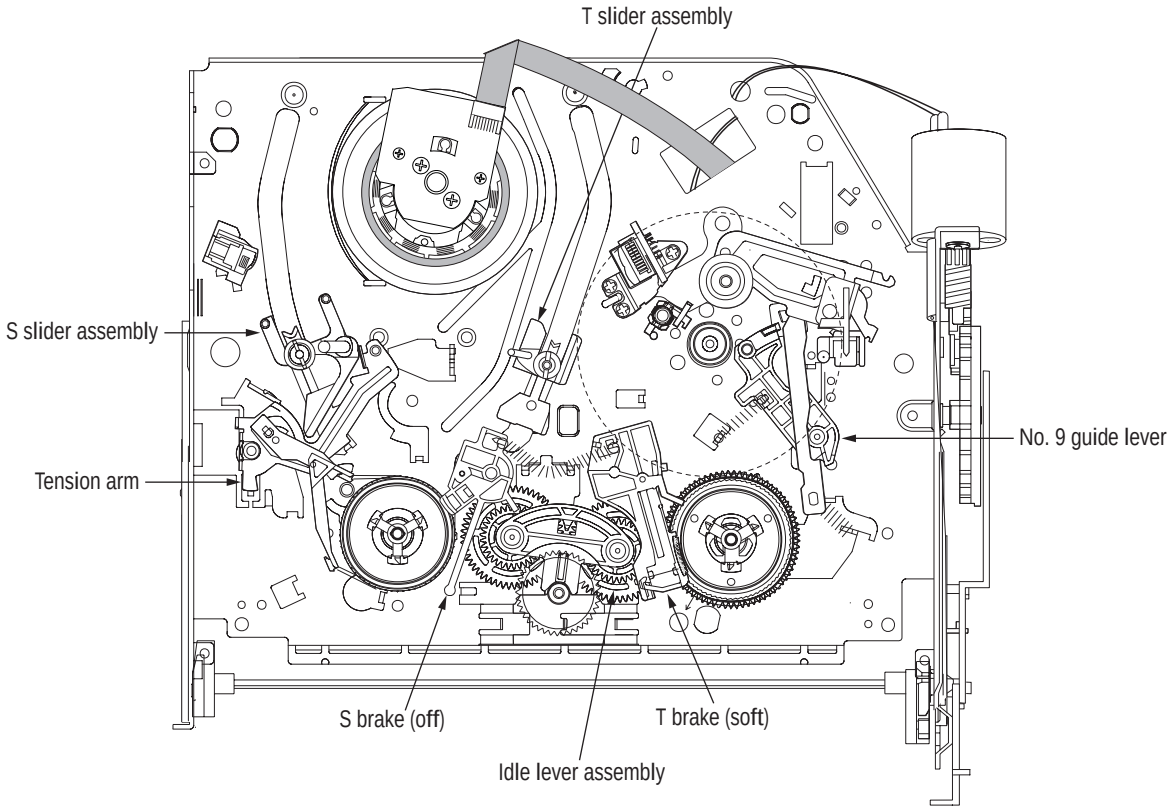


Fig. 8-23 Cassette-Loading Mode (Position I)

<Tape loading>

(1) After slot-in operation (cassette loading), FL cam gear rotates and the cam slider starts shifting, and a loading gear is ready to start.
Under this condition, the mechanism status is as follows :
1) The T main brake actuates so that tape does not com out from the T reel during the loading operation.
(2) The cylinder starts to rotates after the loading motor is rotated.
(3) When the cam slider reaches the position II (loading / unloading modes), the mechanism enters the loading status and operates as described below.
1) S,T sliders are moved through the loading drive gear and trun on the tension post.
2) The No. 9 guide is loaded.
3) The pinch roller is loaded up to front of the capstan.
4) The head cleaner is actuated during loading operation.
5) The S soft brake is actuated.
(4) When the cam slider passes through the position III, and detects the position IV (playback standby mode), the loading motor stops. Under this condition, the mechanism status is described as below :
❶ The pinch roller is pressed to the capstan.
❷ The No.9 guide is stored in the cassette.
❸ The tension post touches the tape, band brake force is applied, and the tension servo brake mechanism actuates.
❹ Brakes for the reel discs are all off.

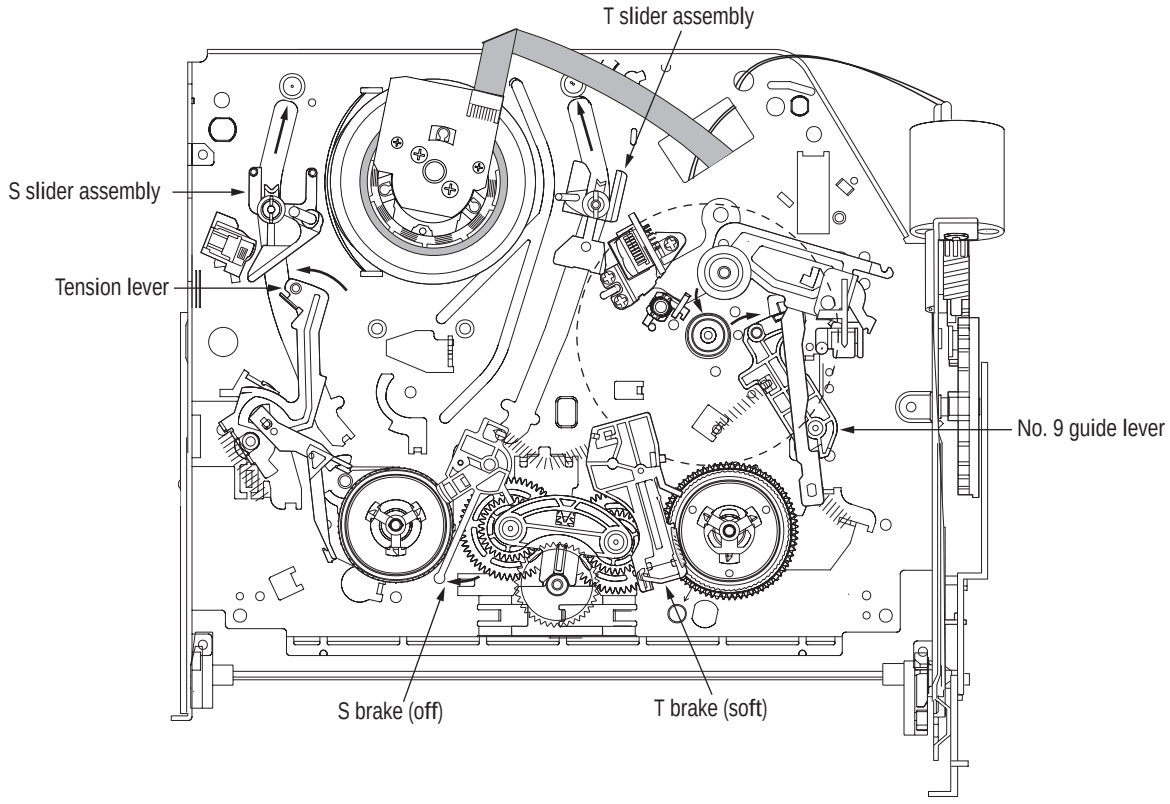


Fig. 8-24 Tape Loading Operation (Position II)

<Playback Stand-by (Stop) mode>

(1) The tape loading operation completes and the loading motor stops.
(2) In the same way as in the playback mode, the capstan motor rotates in forward direction and the T reel disc takes up the tape. (For more details, refer to the playback mode.)
(3) After running the tape for 0.6s, the mechanism rotates the capstan in the reverse direction for 0.3s to slack the tape properly with pinch roller pressed.
(4) If nothing is operated for about 5 minutes, the loading motor rotates in the forward direction and the cam position reaches the position V, and both the loading motor and the cylinder motor stop.
(5) During this period, the video and audio systems are in the same status as in the stop mode.

[2] Tape unloading & Cassette unloading

<Tape Unloading>

(1) When the [EJECT] button is pressed in the stop mode, the mechanism enters the eject mode.
(2) IC601 controls cylinder motor drive IC to make the cylinder motor rotates.
(3) IC601 makes the loading motor rotate in the reverse direction, and shifts the cam slider.
    1) The mechanism components move in the reverse direction against the loading operation.
(4) When the cam slider reaches the position II, IC601 makes the capstan motor rotate in the reverse direction (LP X11) and takes up the tape at a specified torque using the clutch mechanism.
(5) When the cam slider reaches the position I, it brakes the capstan motor to stop, and then stops the loading motor after 230ms passed.

<Cassette unloading>

(1) Furthermore, IC601 makes the loading motor rotate in the reverse direction and also the capstan motor in reverse direction, applies braking force to the capstan motor by detecting the tape start sensor OFF --> ON, and the capstan motor stops.
(2) IC601 makes the loading motor stop after 150ms passed from sensing “ON”.
(3) Also IC601 makes the loading motor rotate in the forward direction after 120ms passed.

[3] Stop mode

(1) The cam slider is in the stop mode (position V) and each motor stops.
(2) The mechanism status is as follows :
1) The S, T guide rollers are in the loading status.
2) The pinch roller is kept away from the capstan.
3) The tension post is shifted to the reel disc side. That is, the band brake is released from the ON status and the back tension is also released.
4) The S, T soft brakes are being applied.

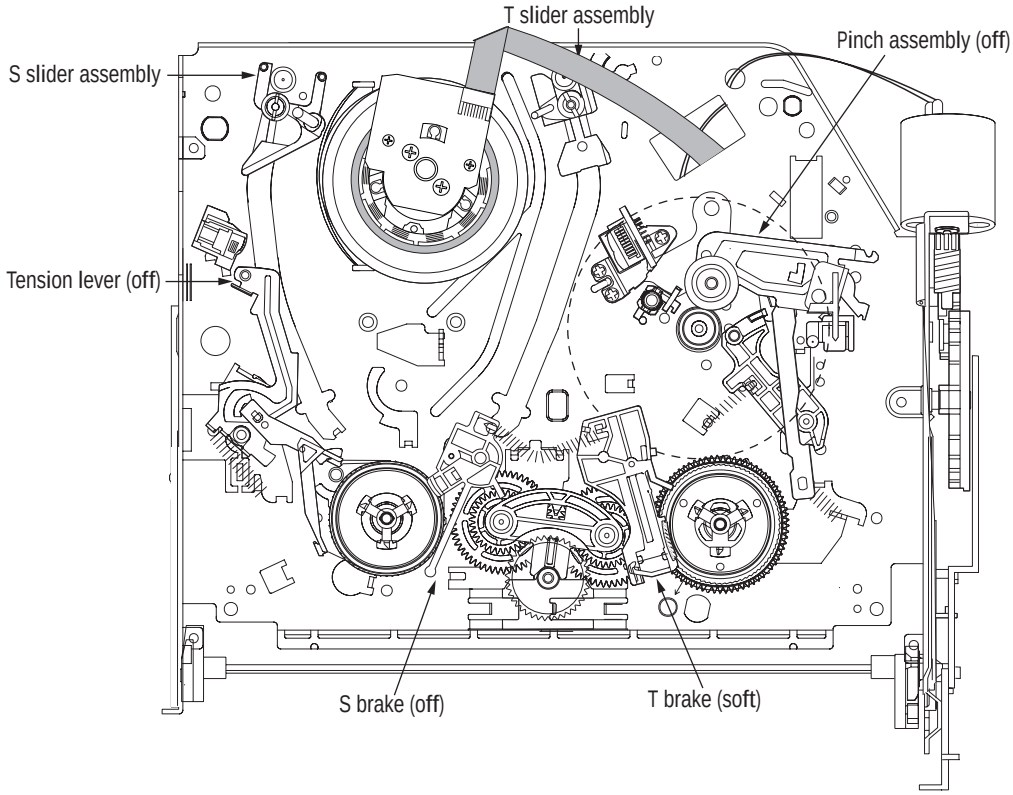


Fig. 8-25 Stop Mode (Position V)

[4] FF/REW mode

(1) When the [REW] button is pressed in playback standby mode, the mode enters the FF/REW mode.
(2) IC601 controls Capstan Motor Drive IC and makes the loading motor rotate in the forward direction.
The loading motor stops when the cam position reaches the position VI, VII (FF/REW mode).
The mechanism status is as follows :
1) The pinch roller is OFF.
2) The No. 9 guide is once loaded but immediately returned.
3) The tension post is moved to the reel disc side. That is, the band brake is released from the ON status and the back tension is released.
4) The clutch holder assembly is in the direct status and the capstan driving force is directly transmitted to the reel disc.
5) Brakes for the reel discs are as follows :
❶ VI position FF/REW 1 mode (S Brake : soft brake, T Brake : off)
❷ VII position FF/REW 2 mode (S Brake : off, T Brake : soft brake)
(3) IC601 makes the capstan motor rotate in the forward direction and the idle gear transmits the rotation to the S/T reel discs to take up the tape.

[5] FF/REW to STOP mode

(1) When the [STOP] button is pressed in the REW mode, the mechanism enters the playback standby mode.
(2) IC601 makes the loading motor rotate in the reverse direction and stops at the position V.
With this mode shift, the mechanism actuates S, T main brakes to stop the tape. Then, the capstan motor also stops by braking force 70ms after detecting “e” position.
(3) IC601 makes the loading motor rotate in the reverse direction again and stops the loading motor when the cam slider reaches the position IV (playback mode), thus setting the playback standby mode.

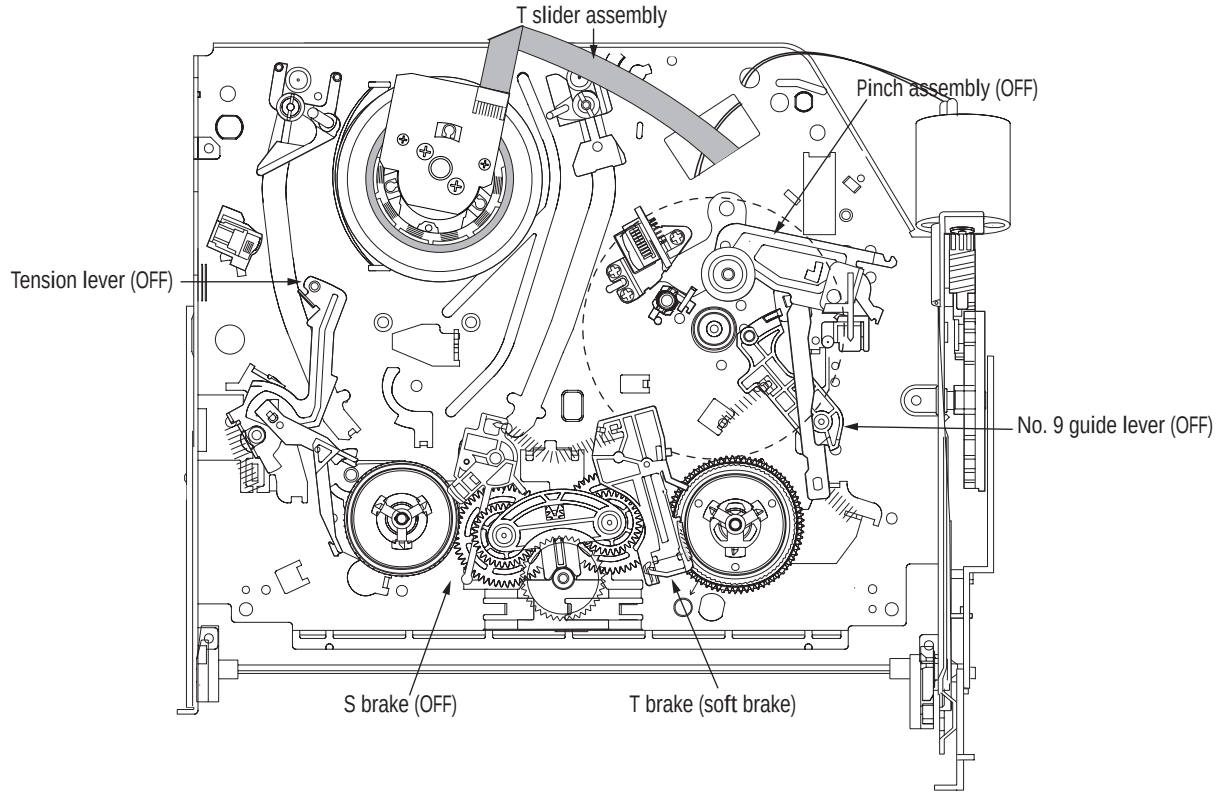


Fig. 8-26 FF/REW 2 Mode (Position VII)

[Playback mode]

(1) When the [PLAY] button is pressed in the stop mode, the mechanism enters the playback mode.
(2) IC601 controls cylinder motor drive IC and rotates the cylinder motor.
(3) IC601 controls Capstan Motor Drive IC to rotate the loading motor in the reverse direction and stops the motor when the cam slider reaches the position IV (playback mode). (When operating from the playback standby mode, the cam slider has been already on the position IV.) The mechanism works as follows :
  1) The pinch roller moves toward the capstan side and press fits the capstan.
  2) The No.9 guide is loaded once and then returned immediately.
  3) The tension post touches the tape, the band braking force is applied, and the tension servo mechanism works.
  4) The clutch holder assembly enters clutched condition.
  5) S,T brakes are released.
(4) IC601 makes the capstan rotate in the forward direction and feeds the tape. The idle gear transmits the rotation to the T reel disc and the reel disc takes up the tape at a constant torque by the clutch mechanism.
(5) IC601 controls the video circuit and switches the playback screen.
(6) The recording speed data identified by IC601 is displayed in the Led module.

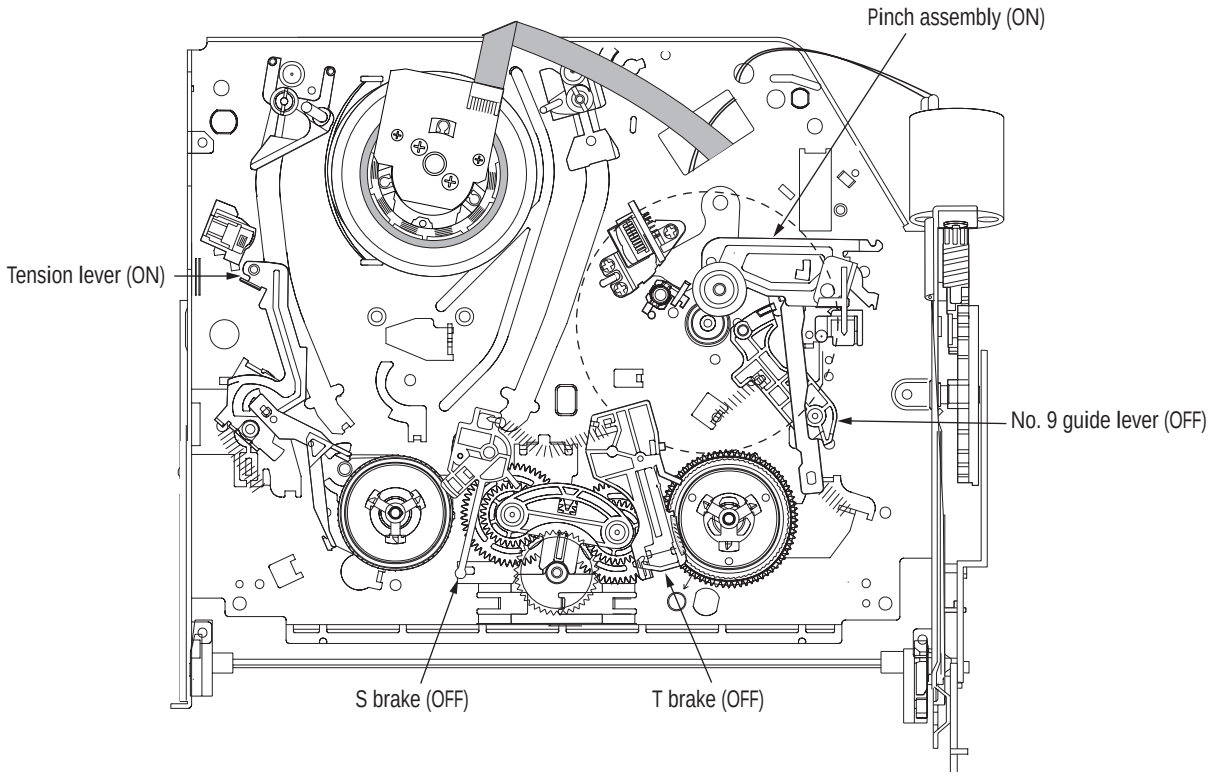


Fig. 8-27 Playback Mode (Position IV)

<Still mode>

(1) When the [PAUSE] button is pressed in the playback mode, the mechanism enters the still mode.
The cam slider is in the position IV (playback mode), the cylinder motor is rotating, and the capstan motor is rotating in the forward direction.
(2) IC 601 controls the audio circuit and actuates the audio mute function.
(3) The capstan motor enters the intermittent operation mode and then stops.
(4) IC 601 maintains the recording speed data just before the still operation.
(5) In the slow mode, the capstan motor rotates continuously in the intermittent driving.

<FPS mode>

(1) When the [FF] button is pressed in the playback mode, the mechanism enters the FPS mode (forward picture search). The cam slider is in the position IV (playback mode), the cylinder motor is rotating, and the capstan motor is rotating in the forward direction.
(2) IC 601 controls the audio circuit to actuate the audio mute operation.
(3) IC601 makes the capstan rotate at 7 times for SP, 21 times for SLP to feed the tape, respectively.
The tape is taken up at a constant torque by the clutch mechanism. (The mechanical operation is the same as that in the playback mode.)
(4) The recording speed data identified by IC601 is displayed on the Led module.

<RPS mode>

(1) When the [REW] button is pressed in the playback mode, the mechanism enters the RPS mode.
The cam slider is in the position IV (playback mode), the cylinder motor is rotating, and the capstan motor is rotating in the forward direction.
(2) IC601 controls the audio circuit to actuate the audio mute operation.
(3) IC601 controls Capstan Motor Drive IC to make the loading motor rotate in the reverse direction.
After 180ms the loading motor stops for 250ms. During the mode shift operation, the mechanism rotates the capstan motor in the forward direction for a constant time so that the tape is not slackened.
(4) When the cam slider reaches the position "c" (loading motor stoped for 250ms), the capstan motor is rotated in the reverse direction for a constant time, and the idle gear is swung toward the S reel disc side.
Then, the loading motor rotates in reverse direction and shifts to the position III (RPS mode).
When the cam slider reaches the position III (RPS mode), the loading motor stops.
The mechanism status is as follows :
1) The No.9 guide is loaded.
2) The tension post is separated from the tape.
3) The T soft brake is turned on.
The cpastan motor rotates in the reverse direction at 7 times for SP, 21 times for SLP to feed the tape in the REW direction, respectively. At the same time, the idle gear transmits the rotation to the S reel disc and the S reel disc takes up the tape by the clutch mechanism.
(5) The recording speed data identified by IC601 is displayed on the Led module.

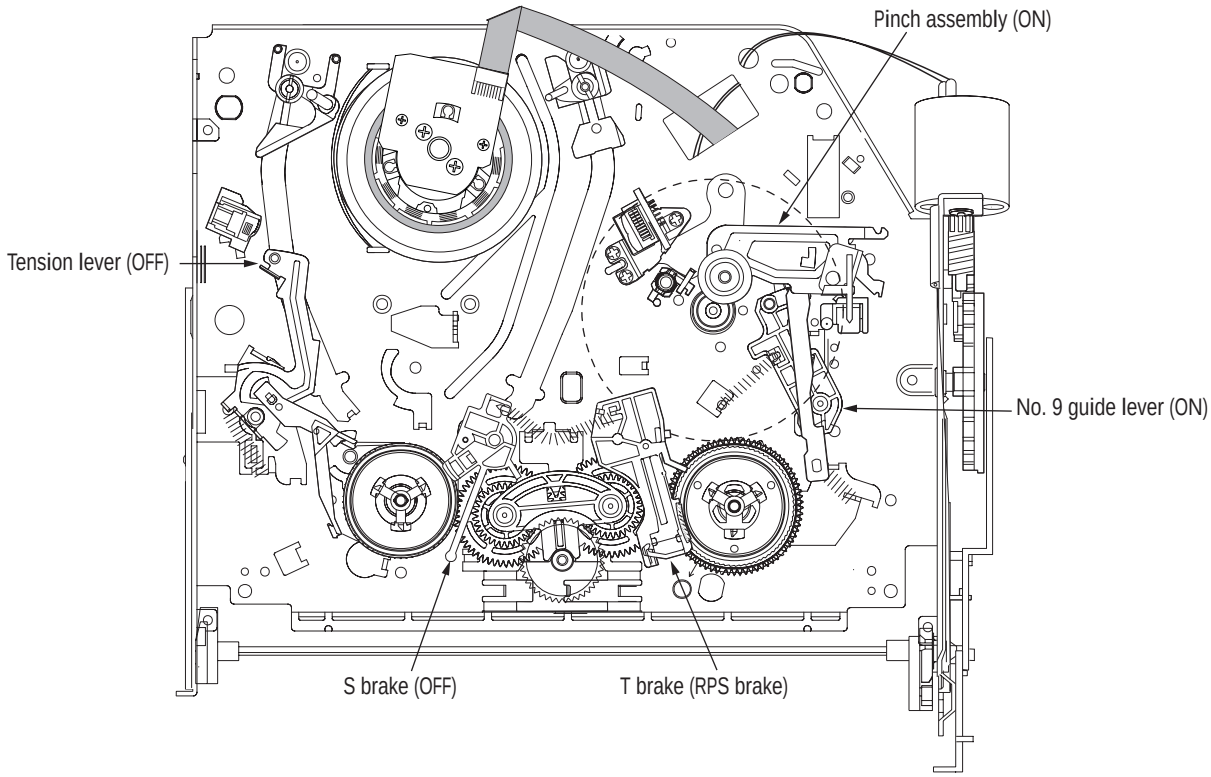


Fig. 8-28 RPS Mode (Position III)

[7] REC mode

<REC mode>

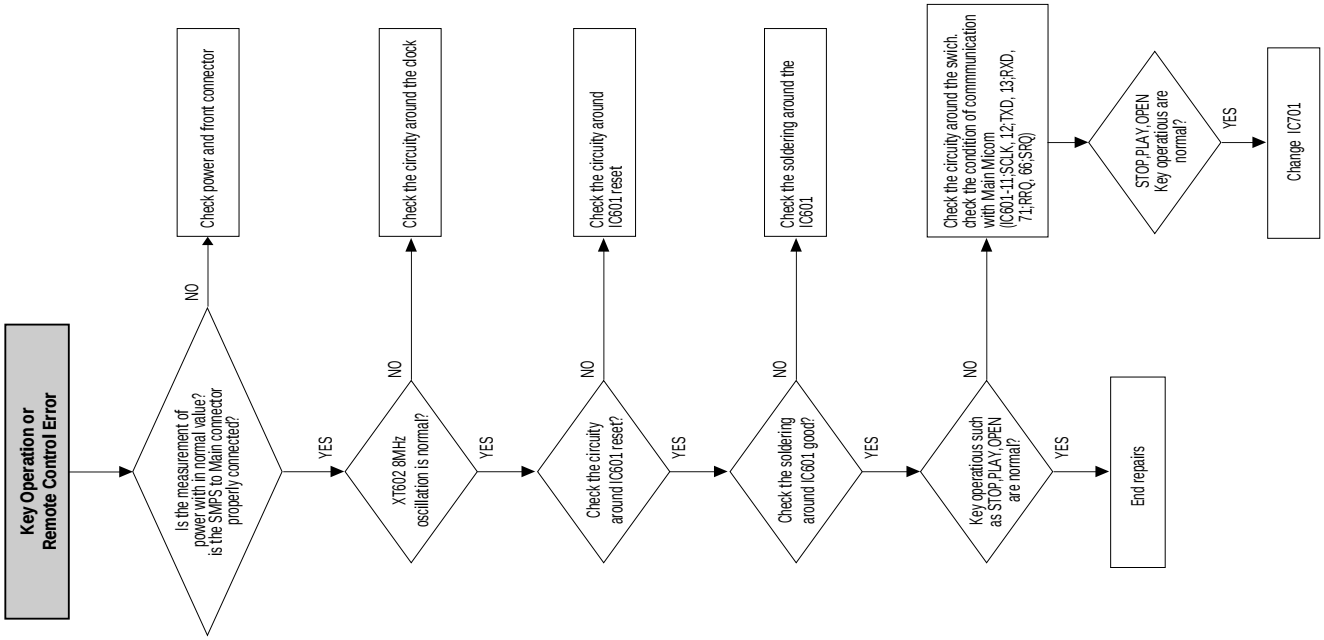
(1) When the [REC] button is pressed in the stop mode, the mechanism enters the REC mode.
(2) The cylinder motor starts and then the loading motor rotates in reverse direction.
The cam slider reaches the position IV (playback mode).
The tape is taken up at a constant torque. The mechanism operations are the same as those in the playback.
(3) IC601 controls the audio circuit and video circuit to set the record enable mode.
(4) Recording mute is released, thus setting the recording status. The CTL signal is output for recording.

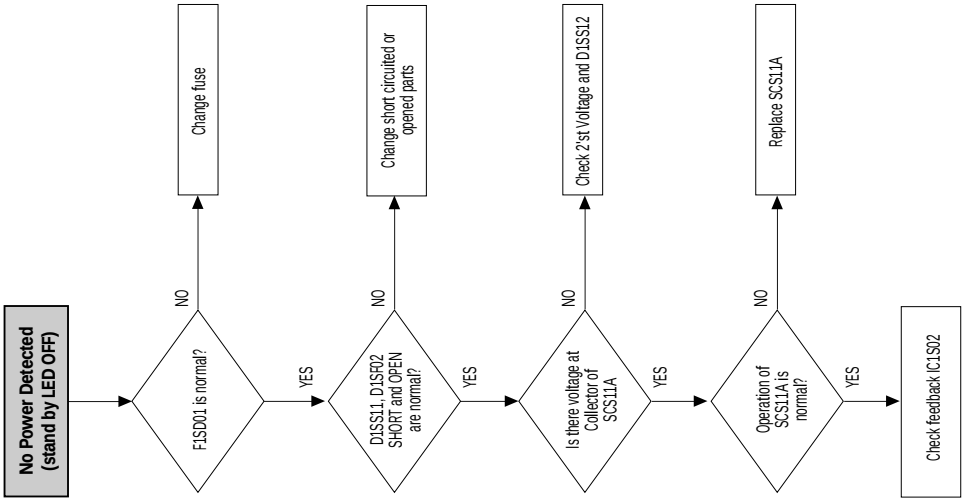
<REC PAUSE mode>

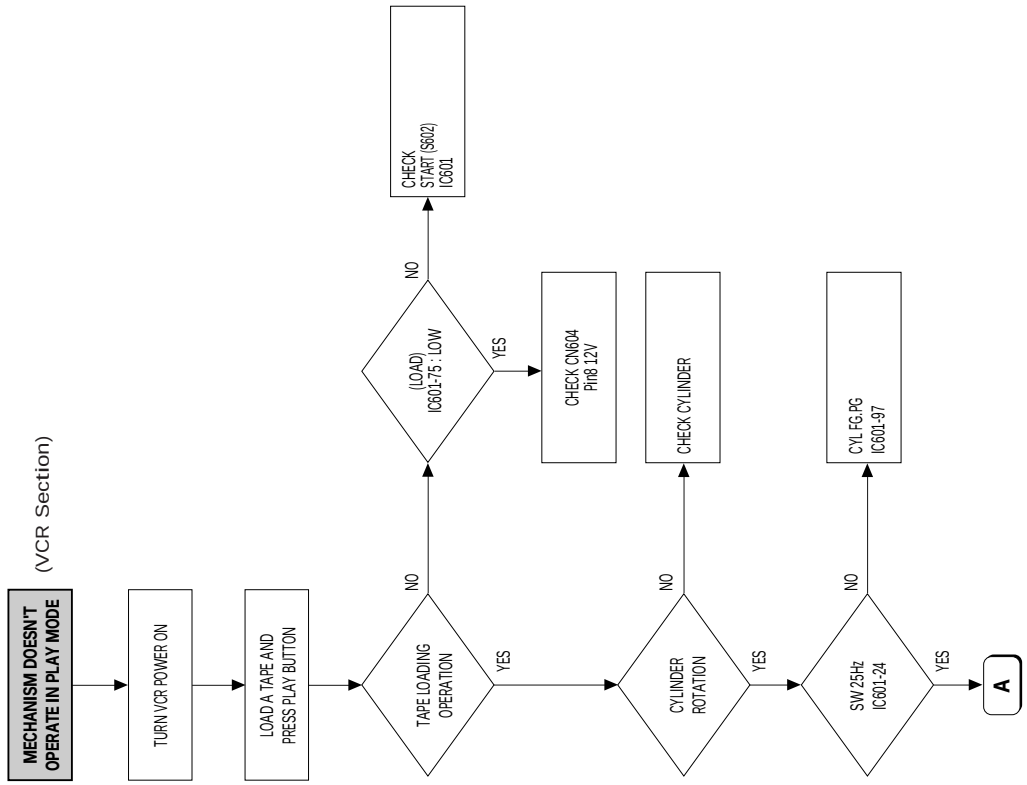
(1) When [PAUSE] button is pressed in the REC mode, the mechanism enters the REC pause mode.
(2) IC601 controls the audio circuit and the video circuit, and releases the record enable mode and performs the rewinding for synchronous editing.
(3) After completion of the rewinding for synchronous editing, the cam slider is in the position IV (playback mode), the cylinder motor is rotating, and the capstan motor and the loading motor stop.

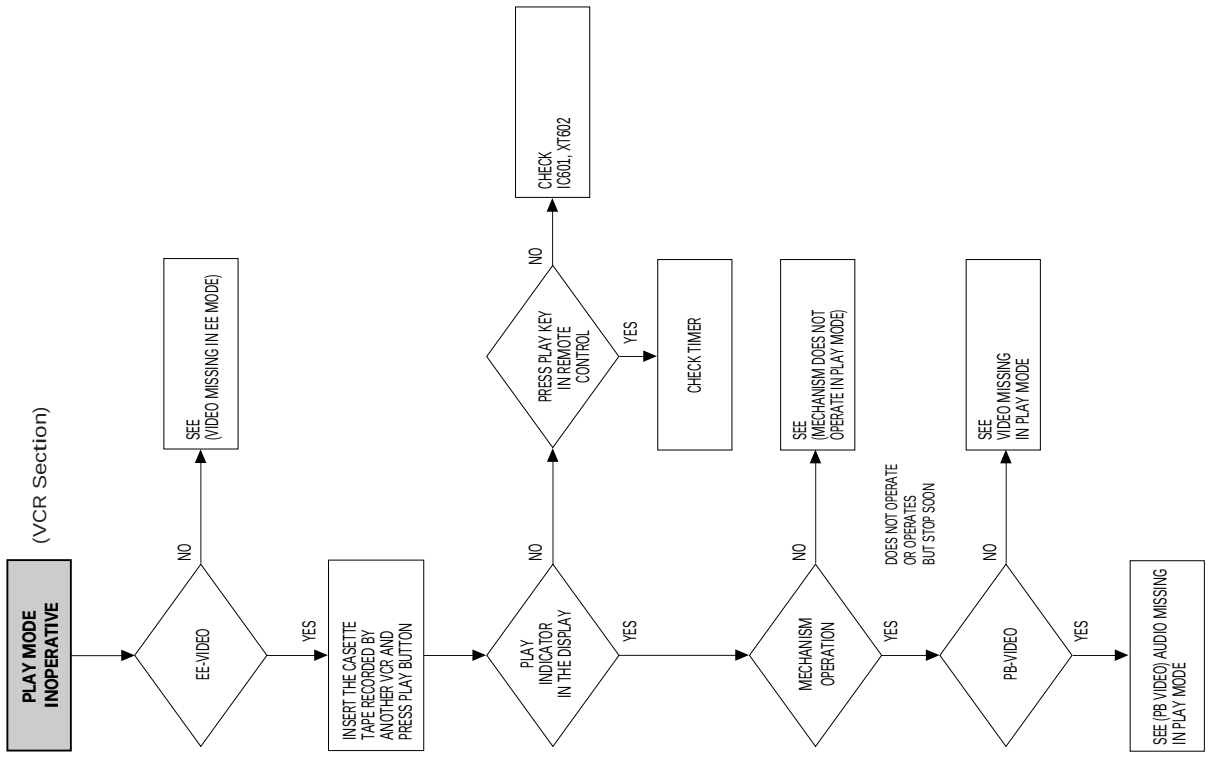
MEMO

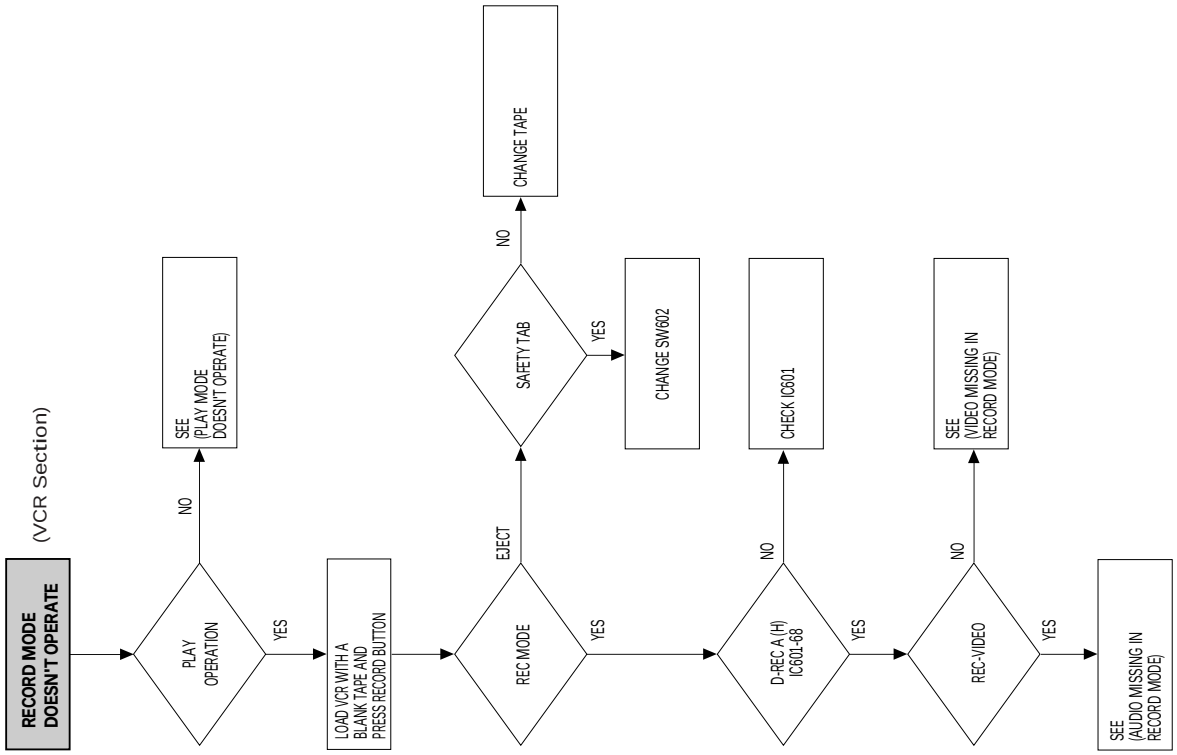
9. Troubleshooting

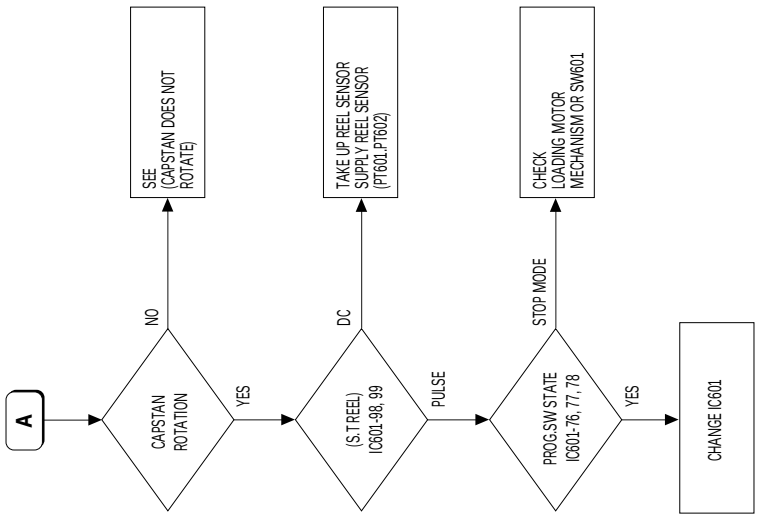

Key Operation or Remote Control Error
Is the measurement of power with in normal value? is the SMPS to Main connector properly connected?
NO
Check power and front connector
YES
XT602 8MHz oscillation is normal?
NO
Check the circuitry around the clock
YES
Check the circuitry around IC601 reset?
NO
Check the circuitry around IC601 reset
YES
Check the soldering around IC601 good?
NO
Check the soldering around the IC601
YES
Key operatious such as STOP,PLAY,OPEN are normal?
NO
Check the circuitry around the swich. check the condition of commmunication with Main Micom (IC801-11:SCLK, 12:TXD, 13:RXD, 71:RRQ, 66:SRQ)
YES
End repairs
STOP,PLAY,OPEN Key operatious are normal?
YES
Change IC701

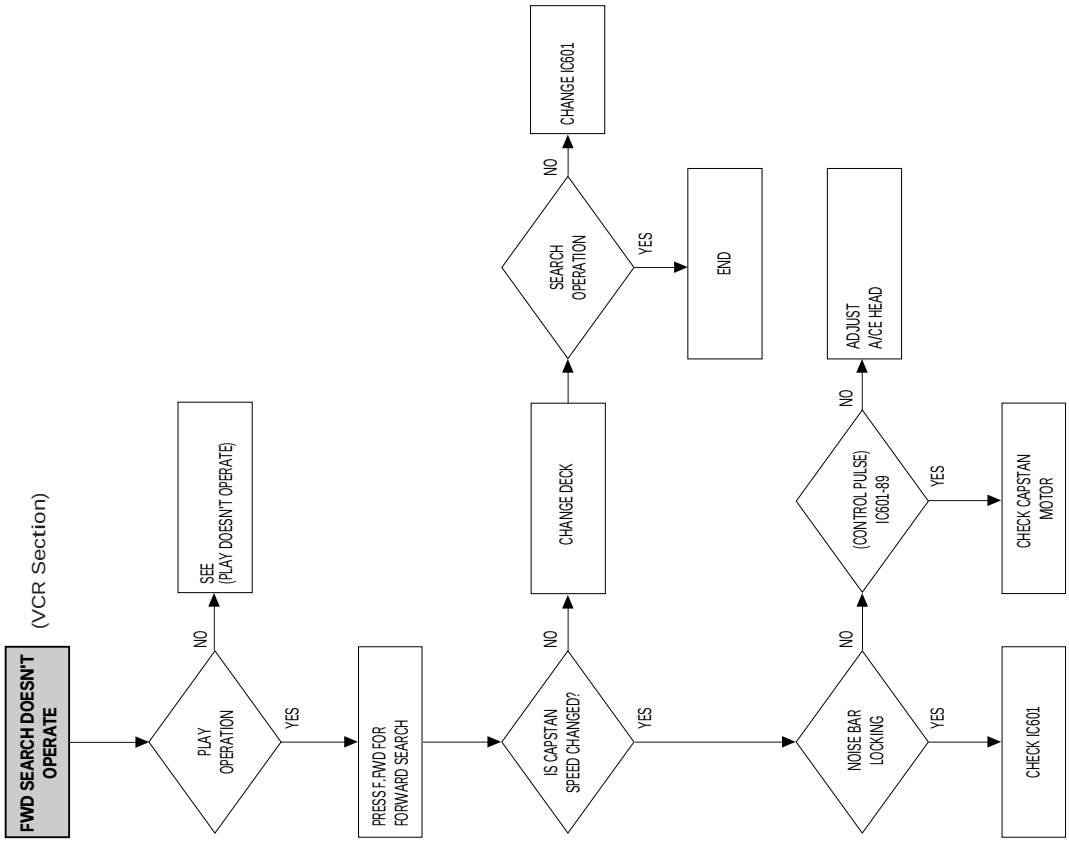


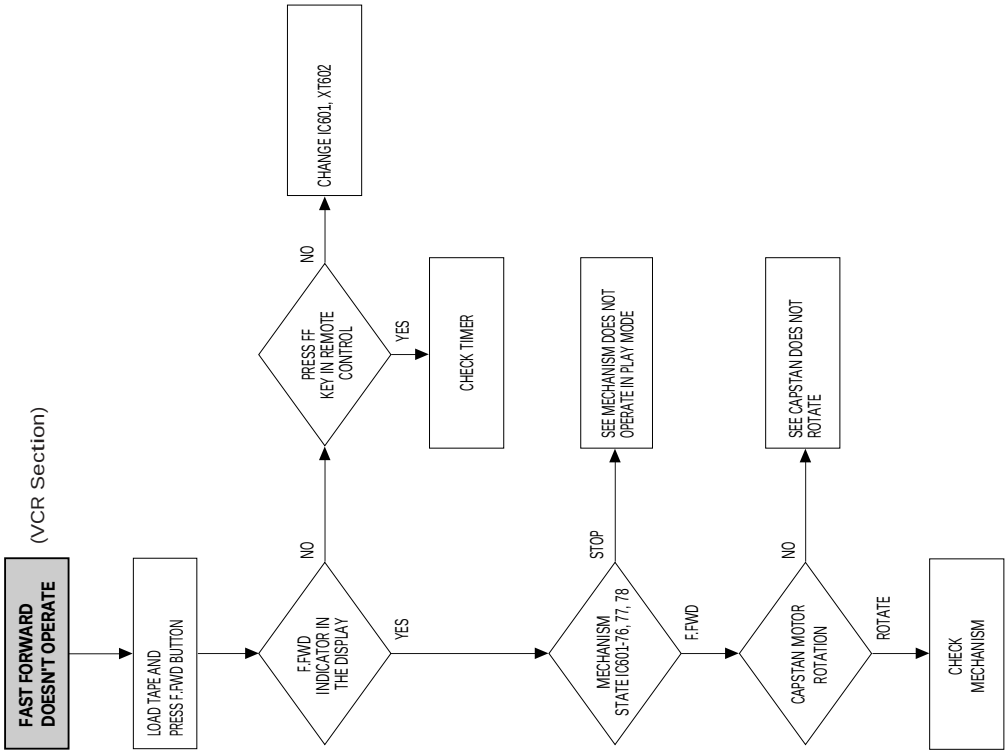

MECHANISM DOESN'T OPERATE IN PLAY MODE
(VCR Section)
TURN VCR POWER ON
LOAD A TAPE AND PRESS PLAY BUTTON
TAPE LOADING OPERATION
NO
YES
(LOAD) IC601-75 : LOW
NO
YES
CHECK START (S602) IC601
CHECK CN604 Pin8 12V
CYLINDER ROTATION
NO
YES
CHECK CYLINDER
SW 25Hz IC601-24
NO
YES
CYL FG,PG IC601-97
A

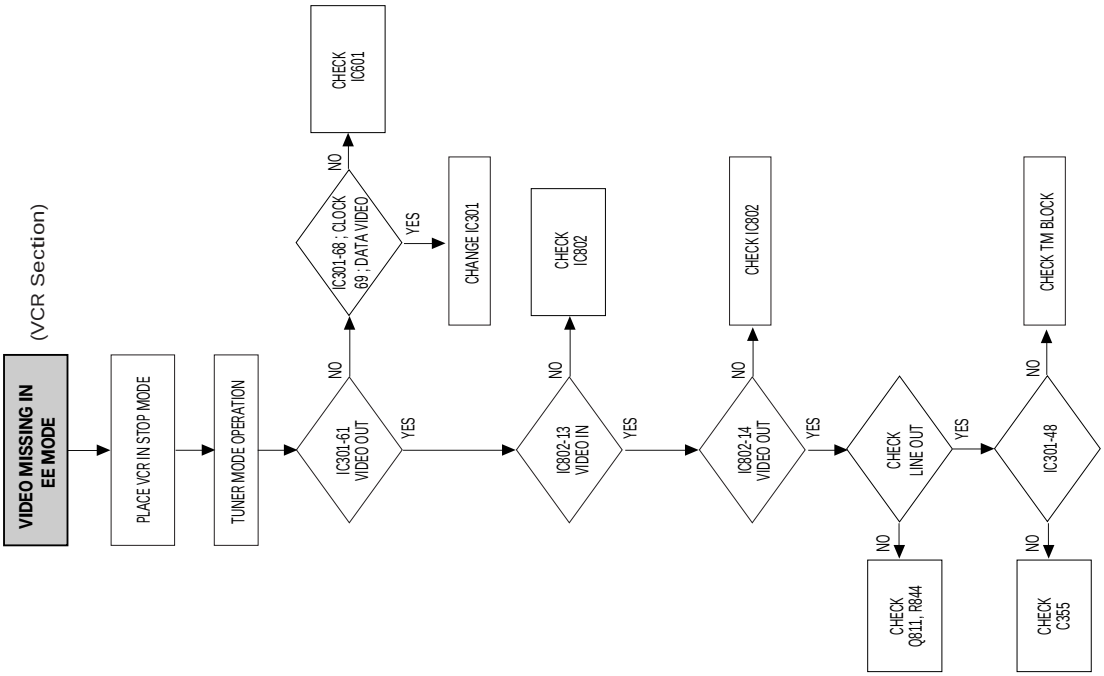

PLAY MODE INOPERATIVE
(VCR Section)
EE-VIDEO
NO
YES
SEE (VIDEO MISSING IN EE MODE)
INSERT THE CASETTE TAPE RECORDED BY ANOTHER VCR AND PRESS PLAY BUTTON
PLAY INDICATOR IN THE DISPLAY
NO
YES
PRESS PLAY KEY IN REMOTE CONTROL
NO
YES
CHECK IC601, XT602
CHECK TIMER
MECHANISM OPERATION
NO
YES
SEE (MECHANISM DOES NOT OPERATE IN PLAY MODE)
DOES NOT OPERATE OR OPERATES BUT STOP SOON
PB-VIDEO
NO
YES
SEE VIDEO MISSING IN PLAY MODE
SEE (PB VIDEO) AUDIO MISSING IN PLAY MODE

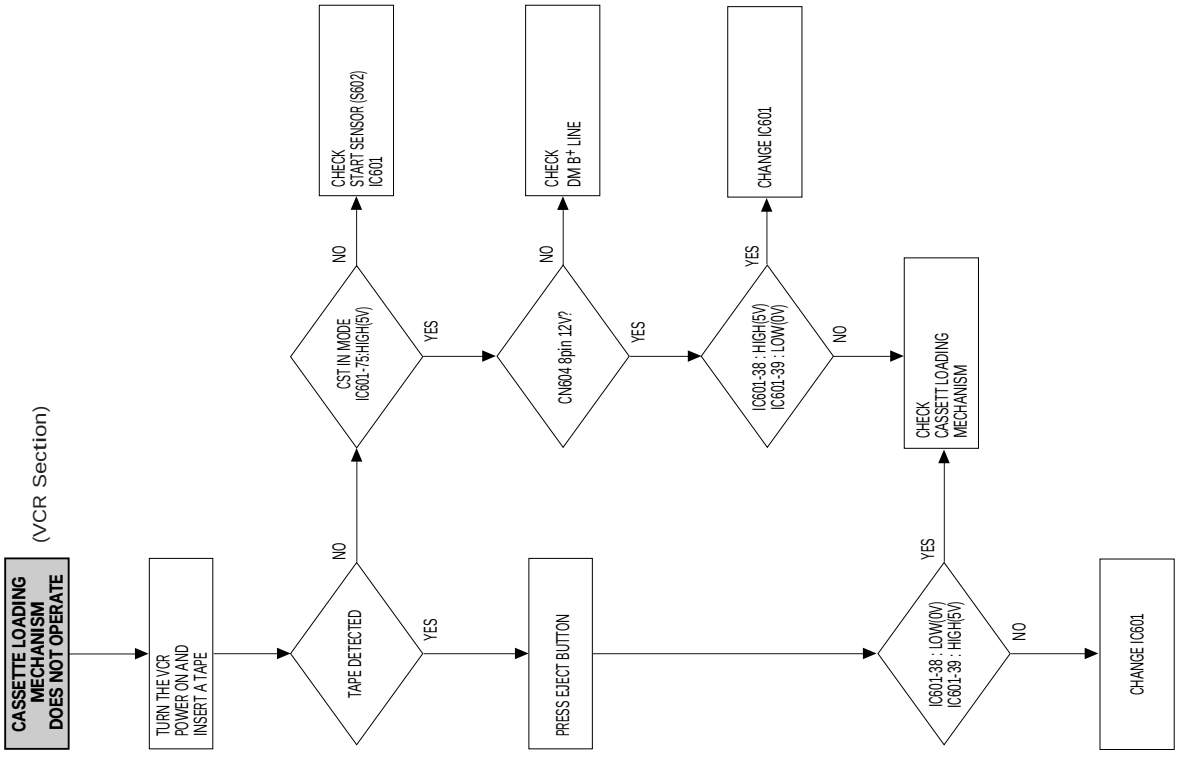

RECORD MODE
DOESN'T OPERATE
(VCR Section)
PLAY
OPERATION
NO
SEE
(PLAY MODE
DOESN'T OPERATE)
YES
LOAD VCR WITH A
BLANK TAPE AND
PRESS RECORD BUTTON
REC MODE
EJECT
SAFETY TAB
NO
CHANGE TAPE
YES
CHANGE SW602
D-REC A (H)
IC601-68
NO
CHECK IC601
YES
REC-VIDEO
NO
SEE
(VIDEO MISSING IN
RECORD MODE)
YES
SEE
(AUDIO MISSING IN
RECORD MODE)

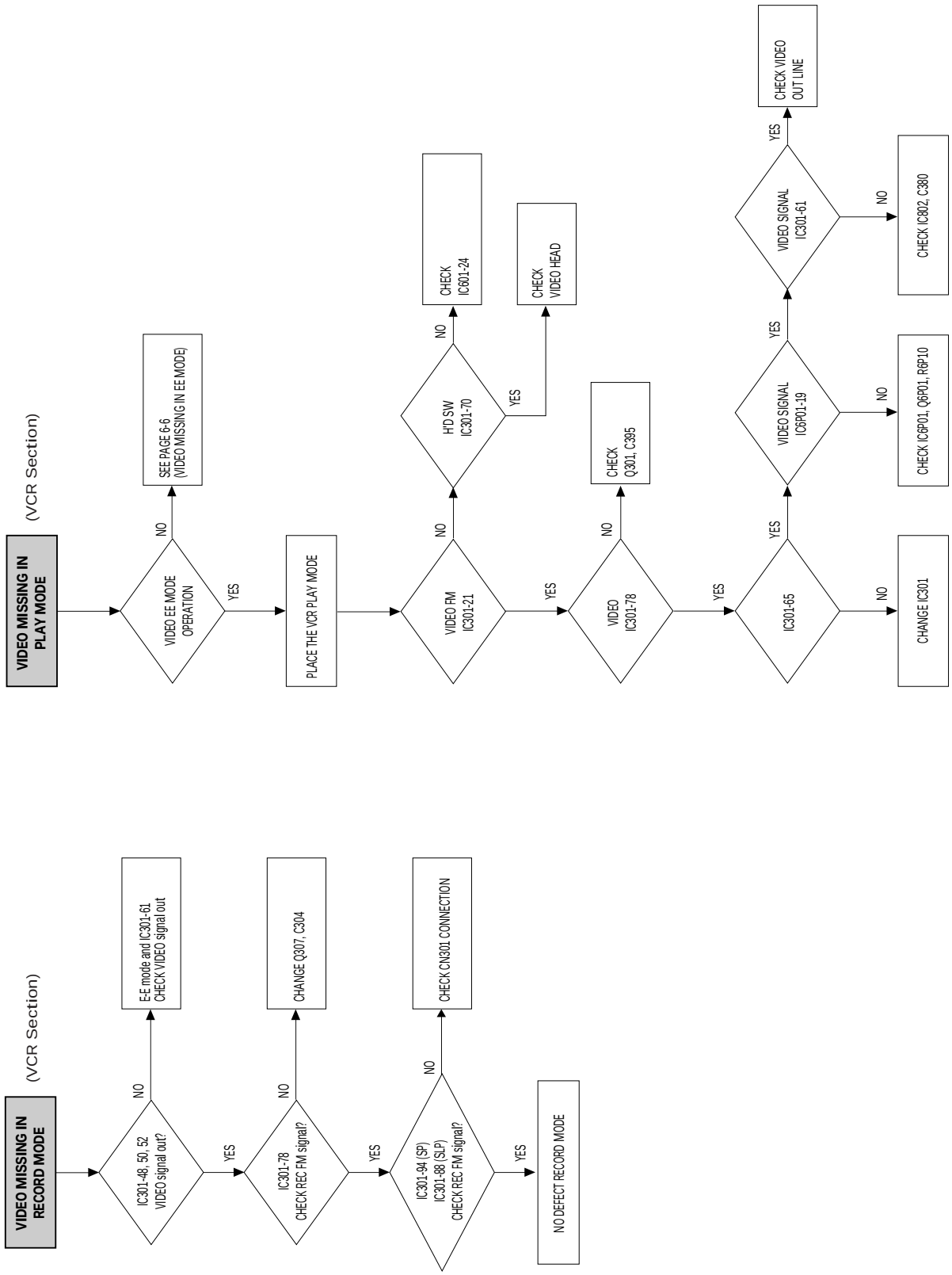

A
CAPSTAN
ROTATION
NO
SEE
(CAPSTAN DOES NOT
ROTATE)
YES
(S.T REEL)
IC601-98, 99
DC
TAKE UP REEL SENSOR
SUPPLY REEL SENSOR
(PT601,PT602)
PULSE
PROG.SW STATE
IC601-76, 77, 78
STOP MODE
CHECK
LOADING MOTOR
MECHANISM OR SW601
YES
CHANGE IC601

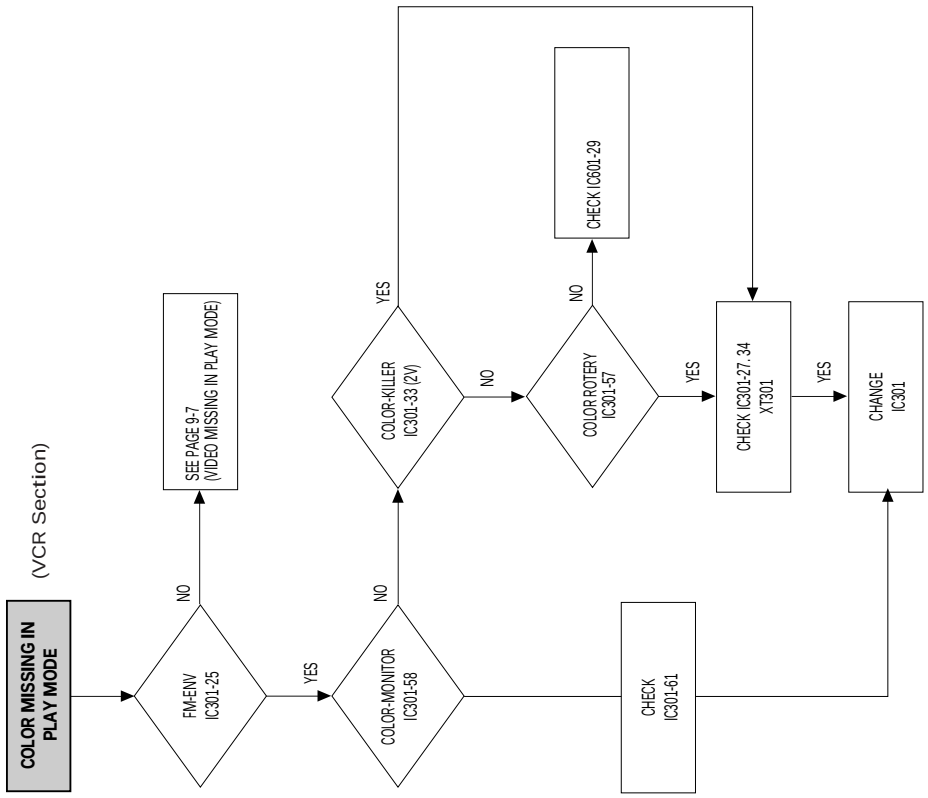

FWD SEARCH DOESN'T OPERATE
(VCR Section)
PLAY OPERATION
NO
SEE (PLAY DOESN'T OPERATE)
YES
PRESS F.FWD FOR FORWARD SEARCH
IS CAPSTAN SPEED CHANGED?
NO
CHANGE DECK
YES
SEARCH OPERATION
NO
CHANGE IC601
YES
END
NOISE BAR LOCKING
NO
(CONTROL PULSE) IC601-89
NO
ADJUST A/C HEAD
YES
CHECK CAPSTAN MOTOR
YES
CHECK IC601

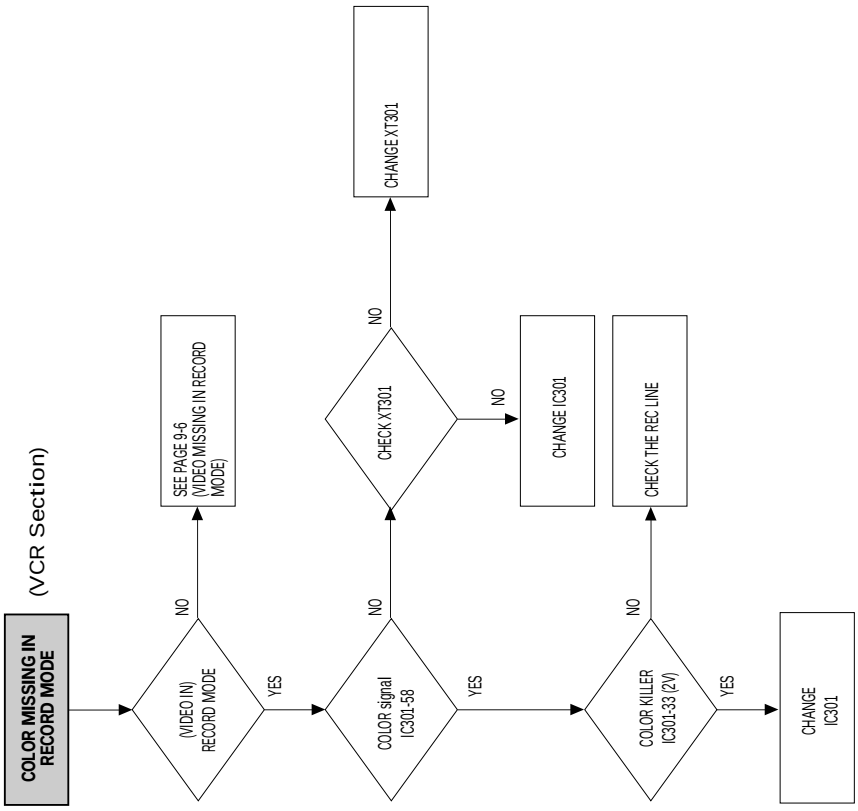

FAST FORWARD DOESN'T OPERATE
(VCR Section)
LOAD TAPE AND PRESS F.FWD BUTTON
F.FWD INDICATOR IN THE DISPLAY
NO
PRESS FF KEY IN REMOTE CONTROL
NO
CHANGE IC601, XT602
YES
CHECK TIMER
YES
MECHANISM STATE IC601-76, 77, 78
STOP
SEE MECHANISM DOES NOT OPERATE IN PLAY MODE
F.FWD
CAPSTAN MOTOR ROTATION
NO
SEE CAPSTAN DOES NOT ROTATE
ROTATE
CHECK MECHANISM

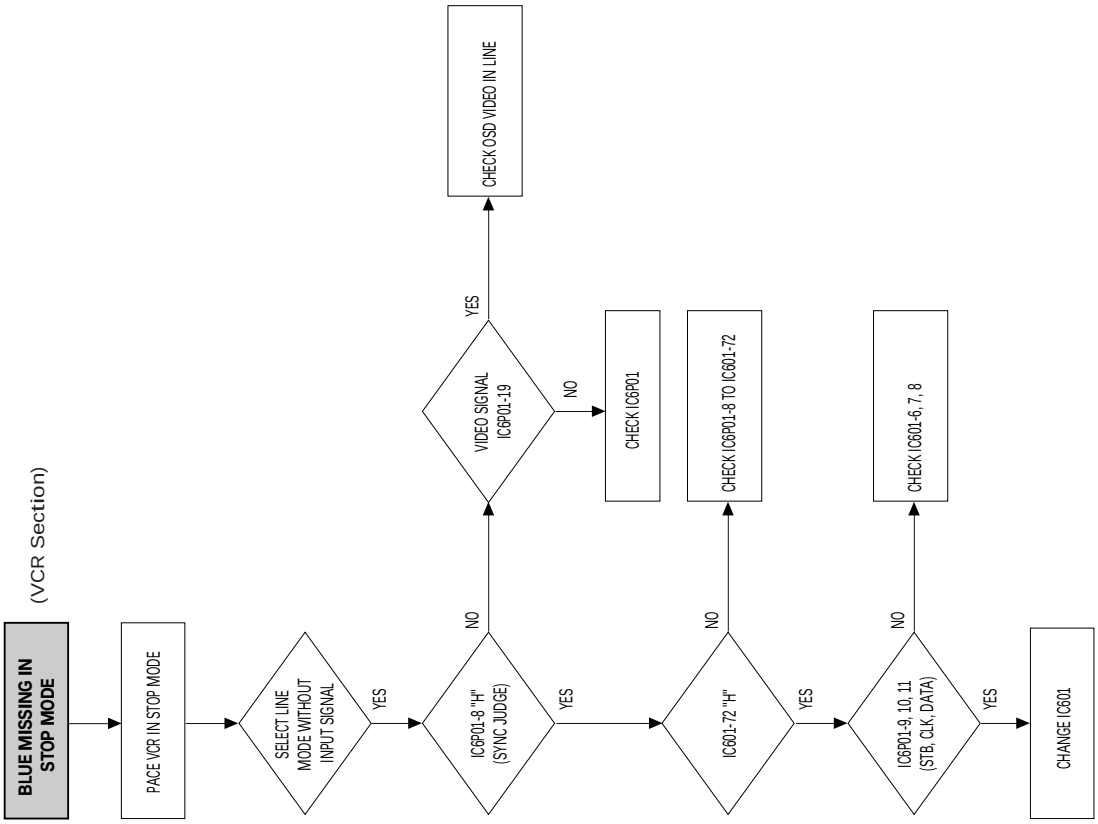

VIDEO MISSING IN EE MODE
(VCR Section)
PLACE VCR IN STOP MODE
TUNER MODE OPERATION
IC301-61 VIDEO OUT
NO
YES
IC301-68 ; CLOCK 69 ; DATA VIDEO
NO
YES
CHECK IC601
CHANGE IC301
IC802-13 VIDEO IN
NO
YES
CHECK IC802
IC802-14 VIDEO OUT
NO
YES
CHECK IC802
CHECK LINE OUT
NO
YES
CHECK Q811, R844
IC301-48
NO
YES
CHECK TM BLOCK
CHECK C355

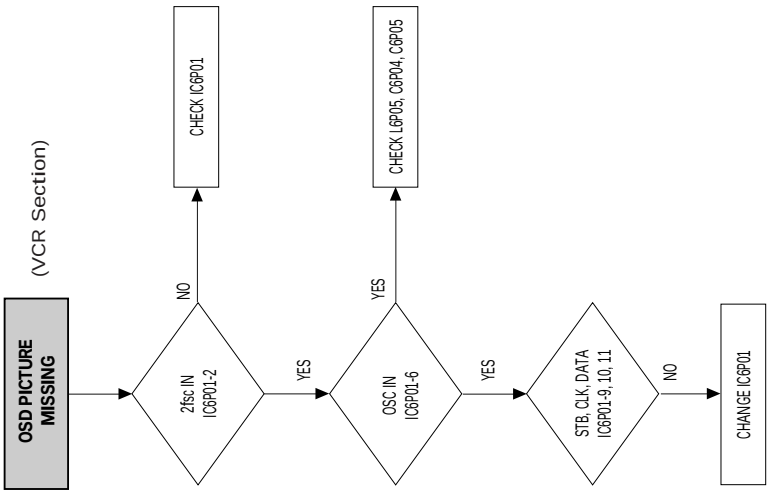

CASSETTE LOADING MECHANISM DOES NOT OPERATE
(VCR Section)
TURN THE VCR POWER ON AND INSERT A TAPE
TAPE DETECTED
NO
YES
CST IN MODE IC601-75:HIGH(5V)
NO
YES
CHECK START SENSOR (S602) IC601
CN604 8pin 12V?
NO
YES
CHECK DM B+ LINE
IC601-38 : HIGH(5V) IC601-39 : LOW(0V)
YES
NO
CHANGE IC601
PRESS EJECT BUTTON
CHECK CASSETT LOADING MECHANISM
IC601-38 : LOW(0V) IC601-39 : HIGH(5V)
YES
NO
CHANGE IC601

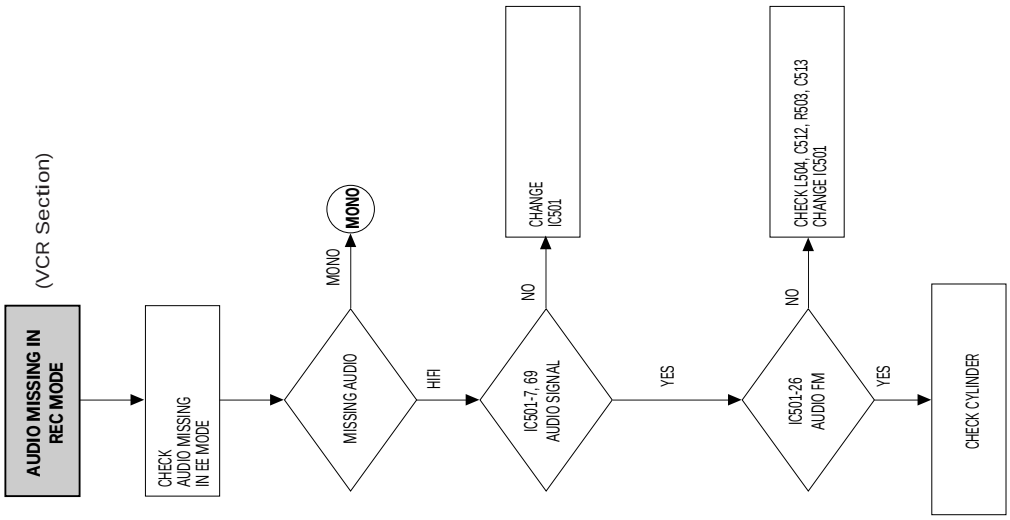

VIDEO MISSING IN PLAY MODE
(VCR Section)
VIDEO EE MODE OPERATION
NO
SEE PAGE 6-6 (VIDEO MISSING IN EE MODE)
YES
PLACE THE VCR PLAY MODE
VIDEO FM IC301-21
NO
CHECK IC601-24
H'D SW IC301-70
NO
YES
CHECK VIDEO HEAD
YES
VIDEO IC301-78
NO
CHECK Q301, C395
YES
IC301-65
NO
CHANGE IC301
YES
VIDEO SIGNAL IC6P01-19
NO
CHECK IC6P01, Q6P01, R6P10
YES
VIDEO SIGNAL IC301-61
NO
CHECK IC802, C380
YES
CHECK VIDEO OUT LINE
VIDEO MISSING IN RECORD MODE
(VCR Section)
IC301-48, 50, 52 VIDEO signal out?
NO
E-E mode and IC301-61 CHECK VIDEO signal out
YES
IC301-78 CHECK REC FM signal?
NO
CHANGE Q307, C304
YES
IC301-94 (SP) IC301-88 (SLP) CHECK REC FM signal?
NO
CHECK CN301 CONNECTION
YES
NO DEFECT RECORD MODE

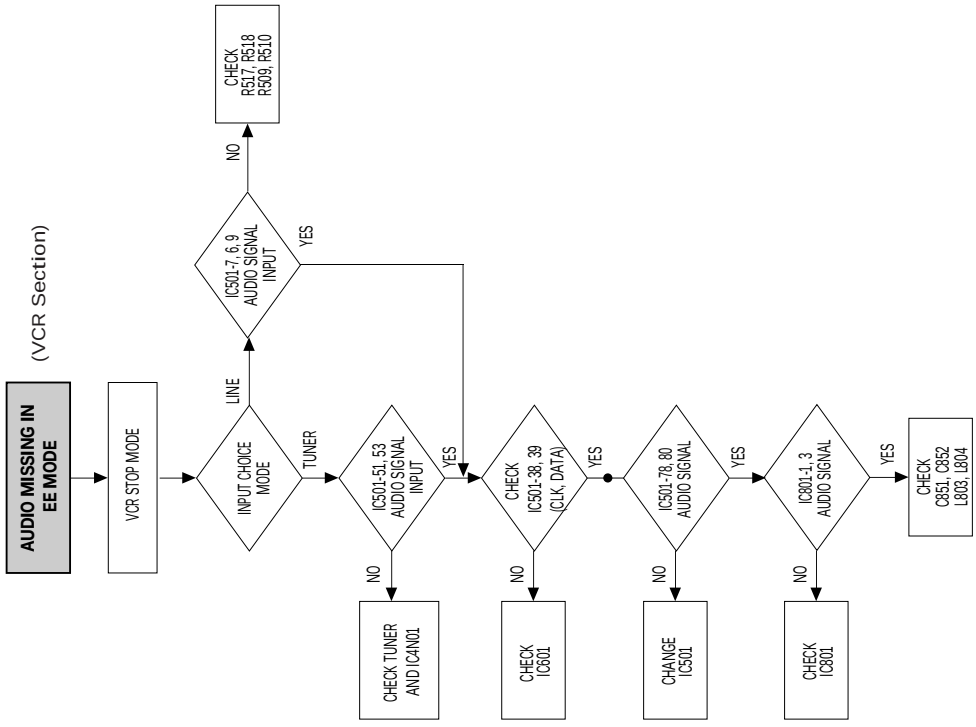

COLOR MISSING IN PLAY MODE
(VCR Section)
FM-ENV IC301-25
NO
SEE PAGE 9-7 (VIDEO MISSING IN PLAY MODE)
YES
COLOR-MONITOR IC301-58
NO
CHECK IC301-61
COLOR-KILLER IC301-33 (2V)
YES
NO
CHECK IC601-29
COLOR ROTERY IC301-57
NO
YES
CHECK IC301-27. 34 XT301
YES
CHANGE IC301

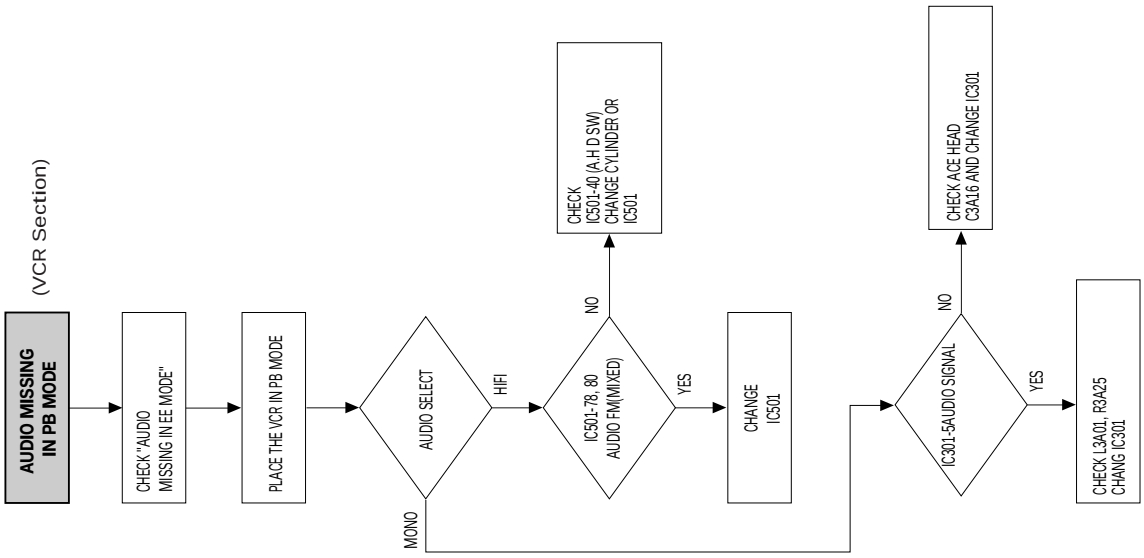

COLOR MISSING IN RECORD MODE
(VCR Section)
(VIDEO IN) RECORD MODE
NO
SEE PAGE 9-6 (VIDEO MISSING IN RECORD MODE)
YES
COLOR signal IC301-58
NO
CHANGE XT301
YES
CHECK XT301
NO
CHANGE IC301
COLOR KILLER IC301-33 (2V)
NO
CHECK THE REC LINE
YES
CHANGE IC301

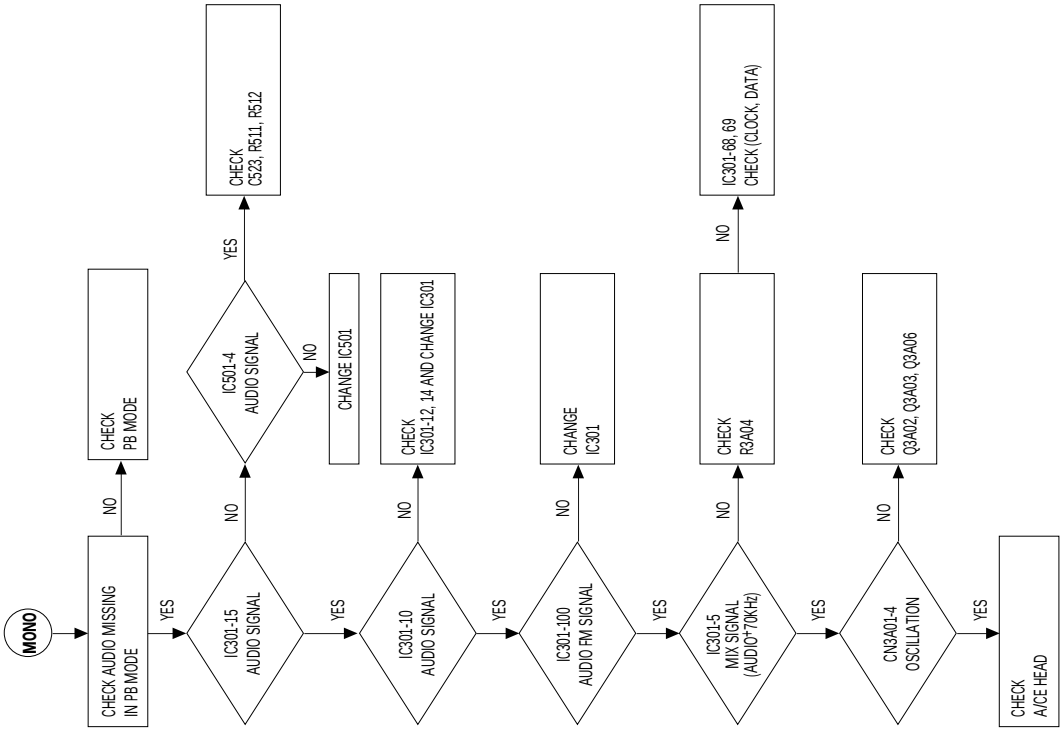

BLUE MISSING IN STOP MODE
(VCR Section)
PACE VCR IN STOP MODE
SELECT LINE MODE WITHOUT INPUT SIGNAL
YES
IC6P01-8 "H" (SYNC JUDGE)
NO
YES
VIDEO SIGNAL IC6P01-19
NO
YES
CHECK OSD VIDEO IN LINE
CHECK IC6P01
IC601-72 "H"
NO
YES
CHECK IC6P01-8 TO IC601-72
IC6P01-9, 10, 11 (STB, CLK, DATA)
NO
YES
CHECK IC601-6, 7, 8
CHANGE IC601

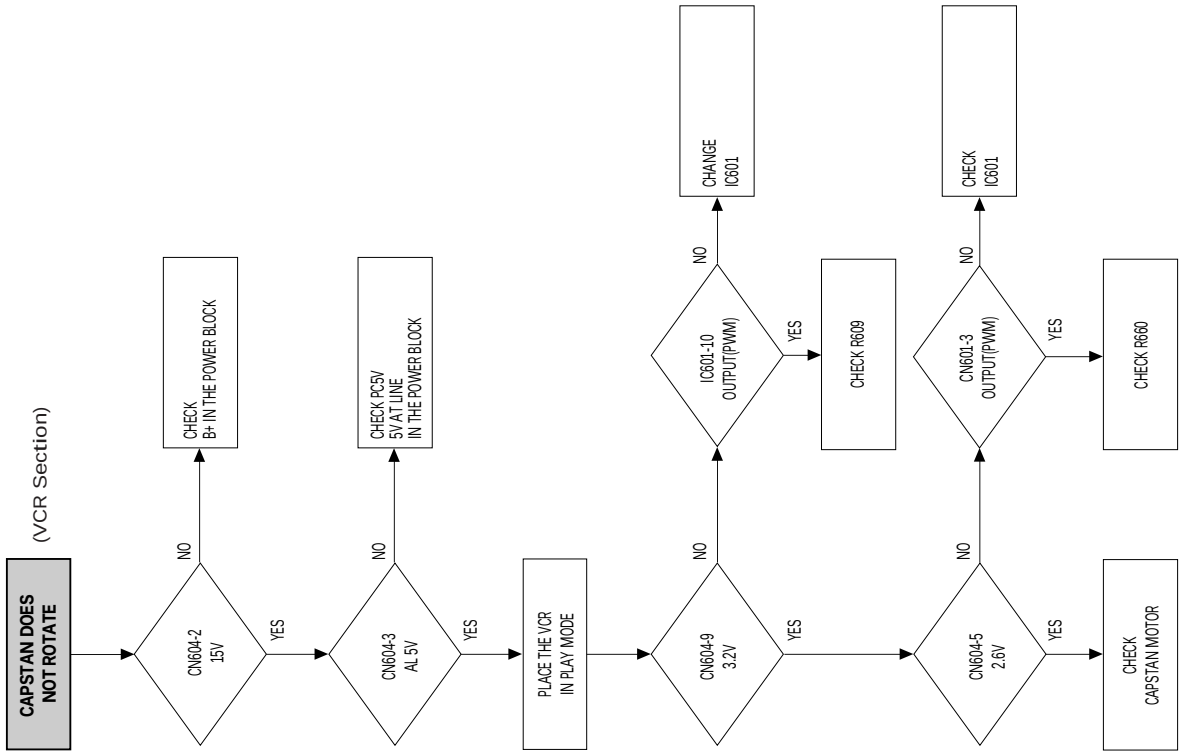

OSD PICTURE MISSING
(VCR Section)
2fsc IN IC6P01-2
NO
CHECK IC6P01
YES
OSC IN IC6P01-6
YES
CHECK L6P05, C6P04, C6P05
YES
STB, CLK, DATA IC6P01-9, 10, 11
NO
CHANGE IC6P01

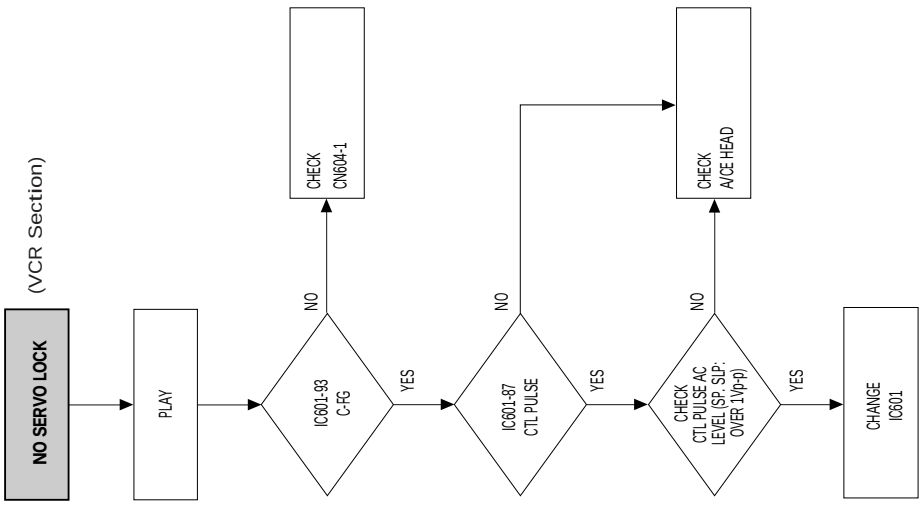

AUDIO MISSING IN REC MODE
(VCR Section)
CHECK AUDIO MISSING IN EE MODE
MISSING AUDIO
MONO
MONO
HIFI
IC501-7, 69 AUDIO SIGNAL
NO
CHANGE IC501
YES
IC501-26 AUDIO FM
NO
CHECK L504, C512, R503, C513 CHANGE IC501
YES
CHECK CYLINDER

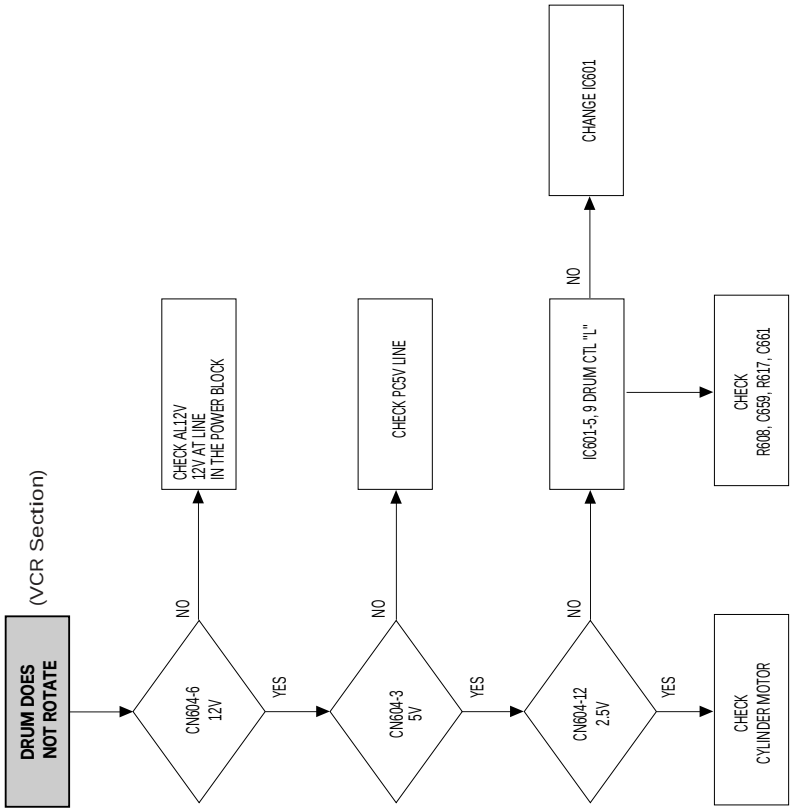

AUDIO MISSING IN EE MODE
(VCR Section)
VCR STOP MODE
INPUT CHOICE MODE
LINE
TUNER
IC501-7, 6, 9 AUDIO SIGNAL INPUT
NO
CHECK R517, R518 R509, R510
YES
IC501-51, 53 AUDIO SIGNAL INPUT
NO
CHECK TUNER AND ICAN01
YES
CHECK IC501-38, 39 (CLK, DATA)
NO
CHECK IC601
YES
IC501-78, 80 AUDIO SIGNAL
NO
CHANGE IC501
YES
IC801-1, 3 AUDIO SIGNAL
NO
CHECK IC801
YES
CHECK C851, C852 L803, L804

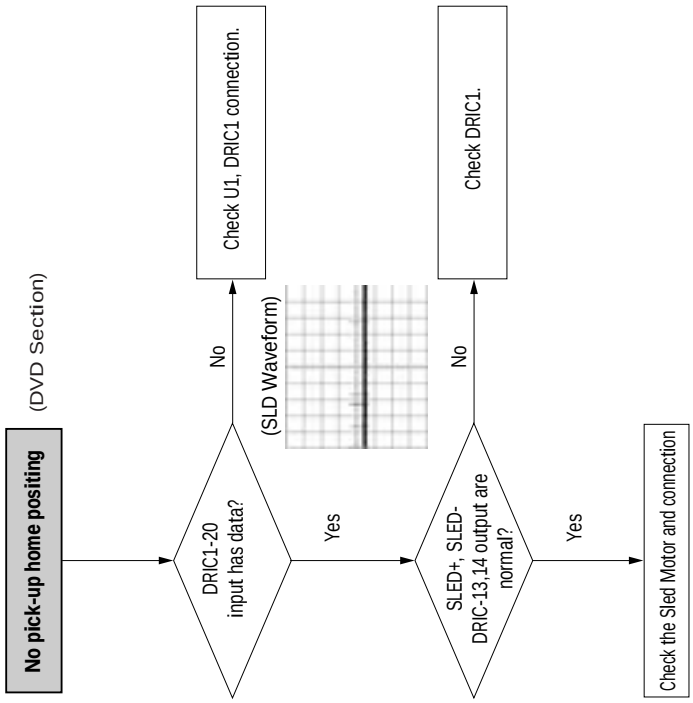

(VCR Section)
AUDIO MISSING IN PB MODE
CHECK "AUDIO MISSING IN EE MODE"
PLACE THE VCR IN PB MODE
AUDIO SELECT
HIFI
MONO
IC501-78, 80 AUDIO FM(MIXED)
NO
YES
CHECK IC501-40 (A,H D SW) CHAINGE CYLINDER OR IC501
CHANGE IC501
IC301-5AUDIO SIGNAL
NO
YES
CHECK ACE HEAD C3A16 AND CHANGE IC301
CHECK L3A01, R3A25 CHANG IC301

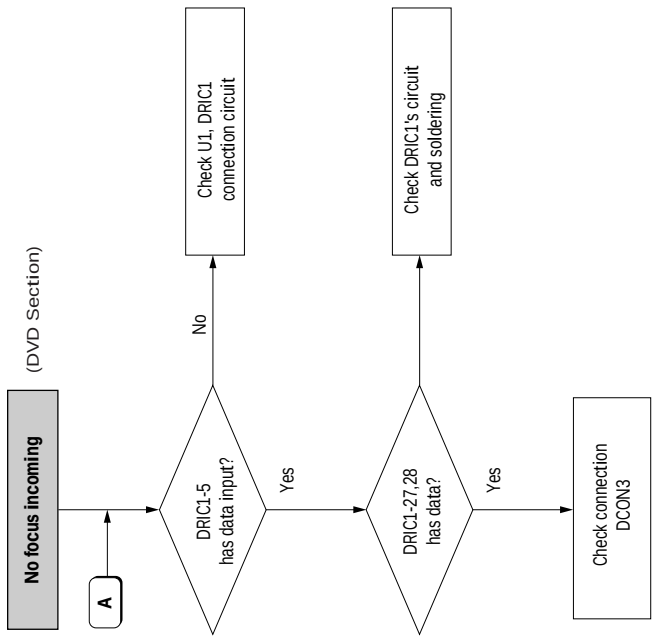

MONO
CHECK AUDIO MISSING IN PB MODE
YES
NO
CHECK PB MODE
IC301-15 AUDIO SIGNAL
YES
NO
IC501-4 AUDIO SIGNAL
YES
NO
CHANGE IC501
CHECK C523, R511, R512
IC301-10 AUDIO SIGNAL
YES
NO
CHECK IC301-12, 14 AND CHANGE IC301
IC301-100 AUDIO FM SIGNAL
YES
NO
CHANGE IC301
IC301-5 MIX SIGNAL (AUDIO+70KHz)
YES
NO
CHECK R3A04
IC301-68, 69 CHECK (CLOCK, DATA)
CN3A01-4 OSCILLATION
YES
NO
CHECK Q3A02, Q3A03, Q3A06
CHECK A/CE HEAD

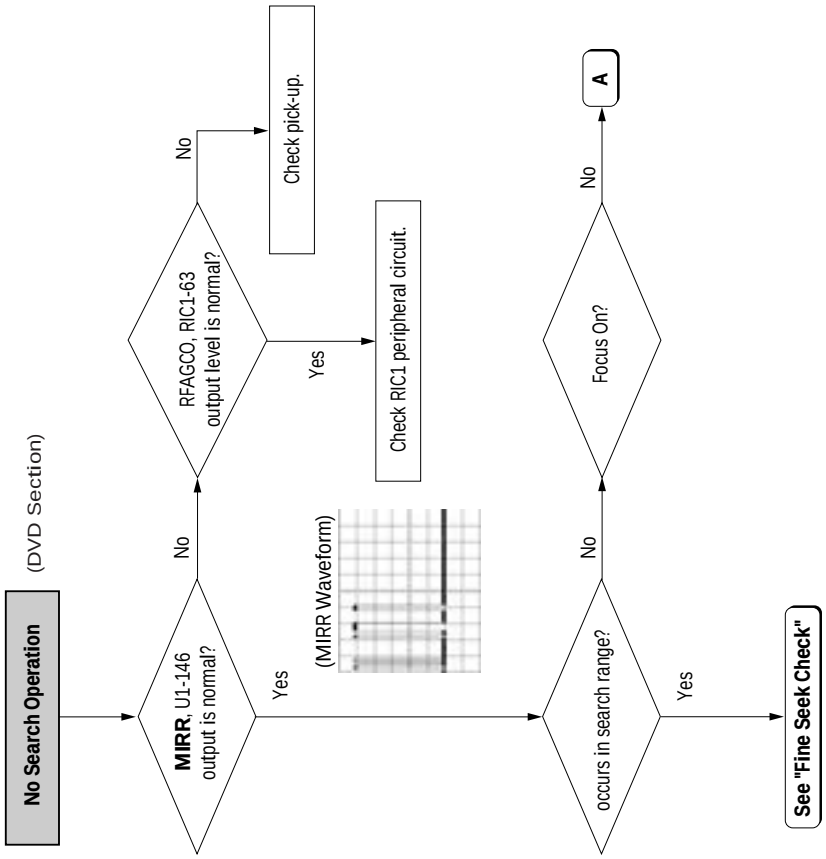

CAPSTAN DOES NOT ROTATE
(VCR Section)
CN604-2 15V
NO
CHECK B+ IN THE POWER BLOCK
YES
CN604-3 AL 5V
NO
CHECK PC5V 5V AT LINE IN THE POWER BLOCK
YES
PLACE THE VCR IN PLAY MODE
CN604-9 3.2V
NO
IC601-10 OUTPUT(PWM)
NO
CHANGE IC601
YES
CHECK R609
YES
CN604-5 2.6V
NO
CN601-3 OUTPUT(PWM)
NO
CHECK IC601
YES
CHECK R660
YES
CHECK CAPSTAN MOTOR

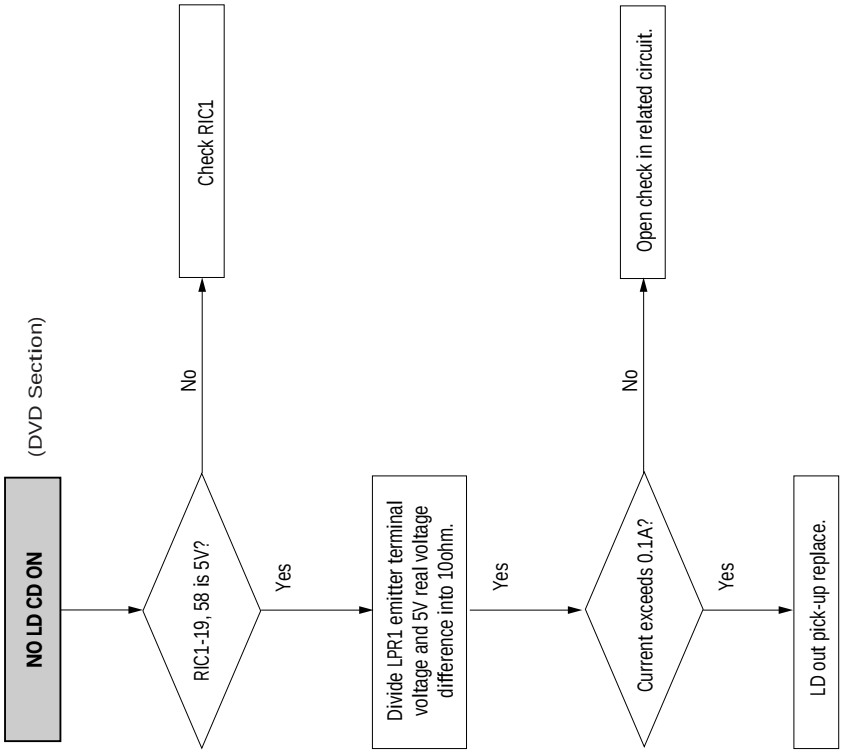

NO SERVO LOCK
(VCR Section)
PLAY
IC601-93 C-FG
NO
CHECK CN604-1
YES
IC601-87 CTL PULSE
NO
YES
CHECK CTL PULSE AC LEVEL (SP, SLP: OVER 1Vp-p)
NO
CHECK A/CE HEAD
YES
CHANGE IC601

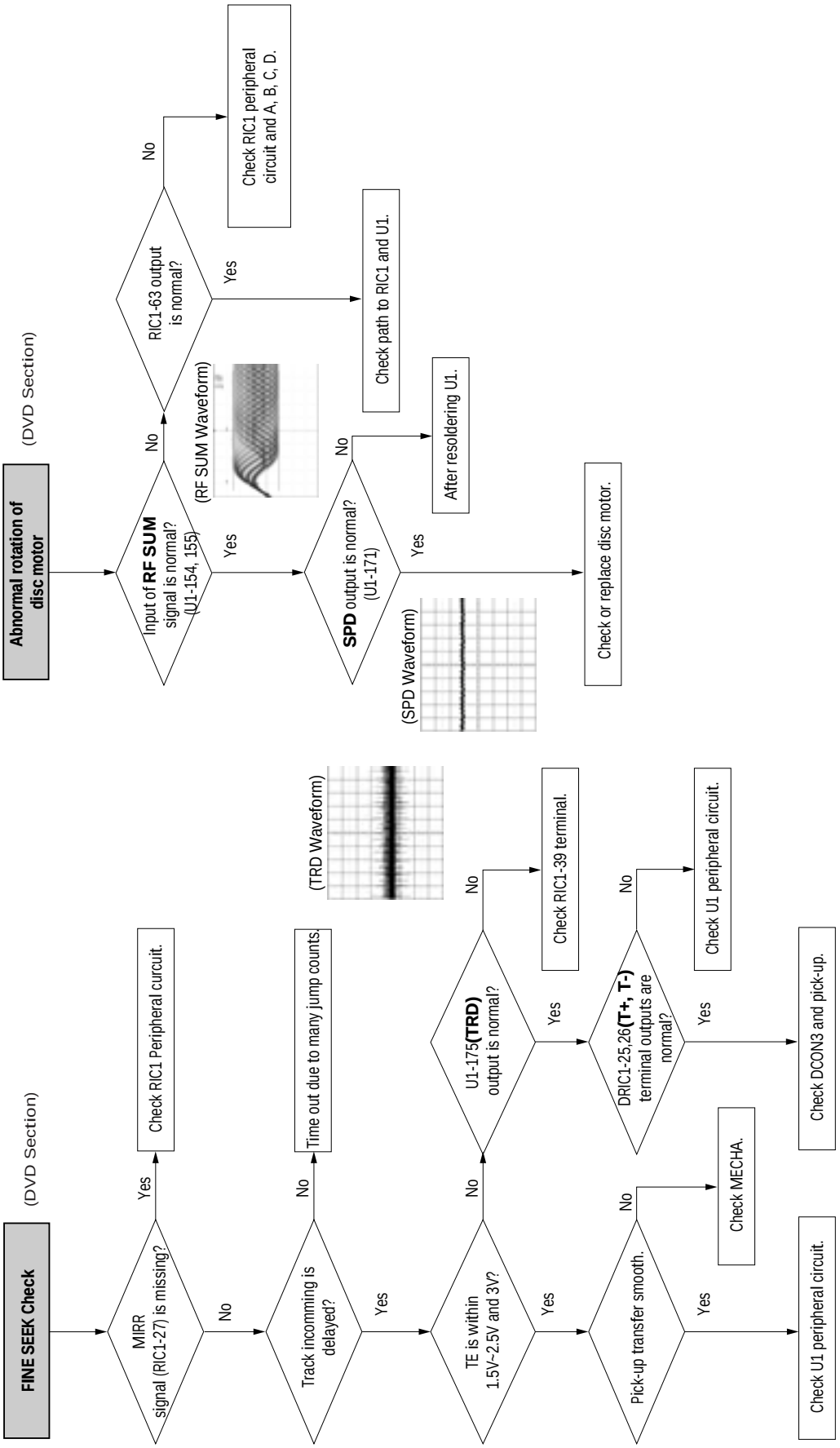

(VCR Section)
DRUM DOES NOT ROTATE
CN604-6 12V
NO
CHECK AL12V 12V AT LINE IN THE POWER BLOCK
YES
CN604-3 5V
NO
CHECK PC5V LINE
YES
CN604-12 2.5V
NO
IC601-5, 9 DRUM CTL "L"
NO
CHANGE IC601
CHECK R608, C659, R617, C661
YES
CHECK CYLINDER MOTOR

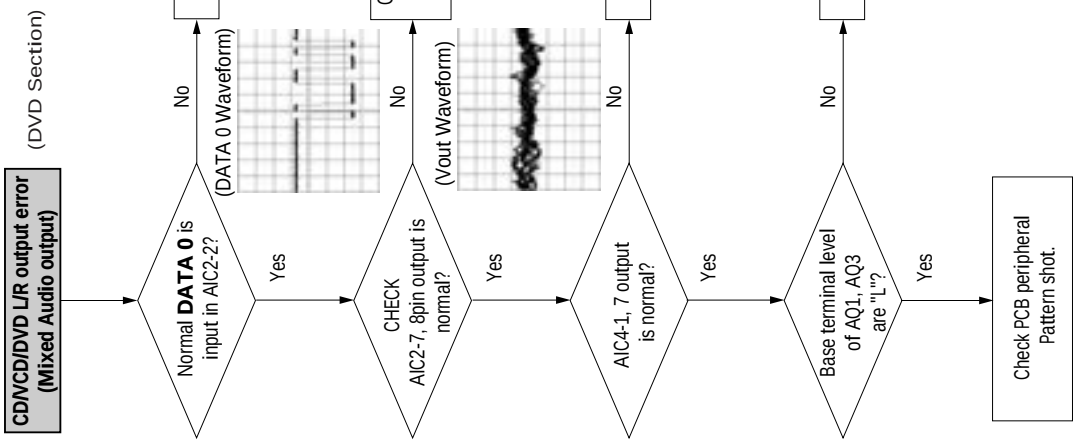

No pick-up home positing
(DVD Section)
DRIC1-20
input has data?
No
Check U1, DRIC1 connection.
(SLD Waveform)
Yes
SLED+, SLED-
DRIC-13,14 output are
normal?
No
Check DRIC1.
Yes
Check the Sled Motor and connection

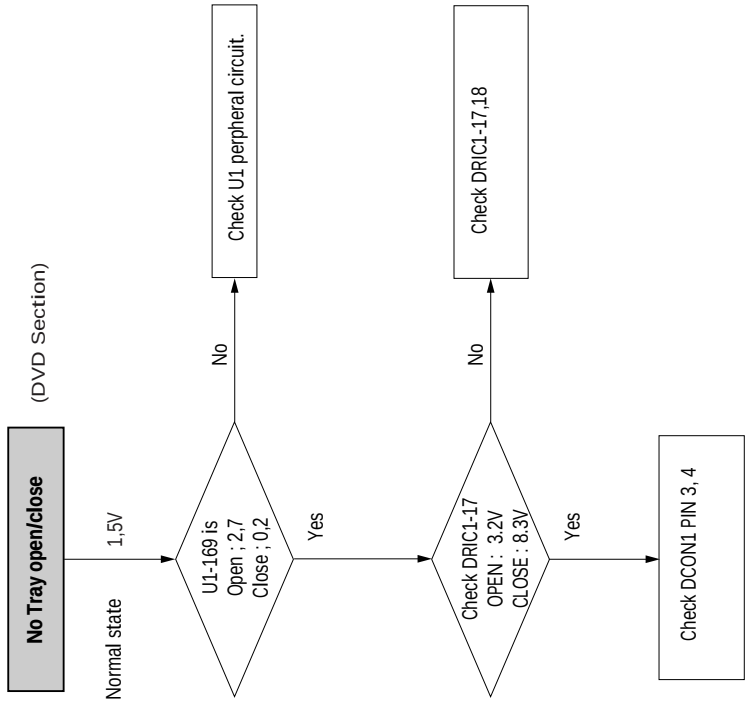

No focus incoming
(DVD Section)
A
DRIC1-5
has data input?
No
Check U1, DRIC1
connection circuit
Yes
DRIC1-27,28
has data?
Check DRIC1's circuit
and soldering
Yes
Check connection
DCON3

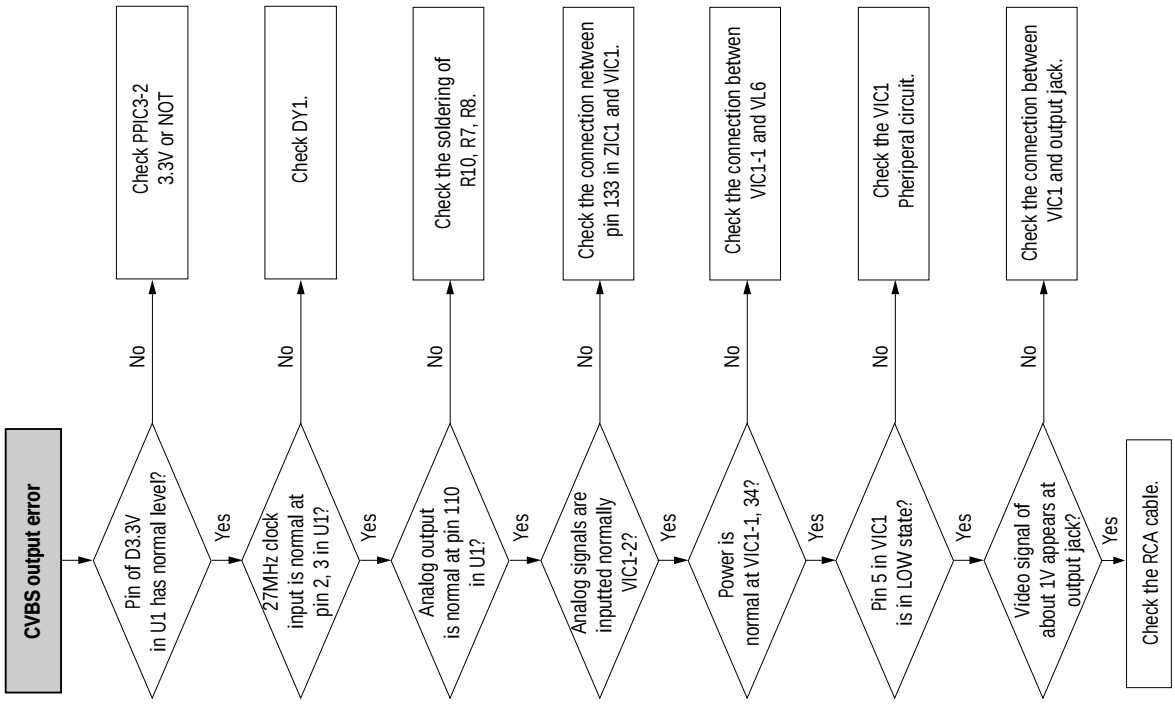

No Search Operation
(DVD Section)
MIRR, U1-146 output is normal?
No
Yes
RFAGCO, RIC1-63 output level is normal?
No
Check pick-up.
Yes
Check RIC1 peripheral circuit.
(MIRR Waveform)
occurs in search range?
No
Focus On?
No
A
Yes
See "Fine Seek Check"

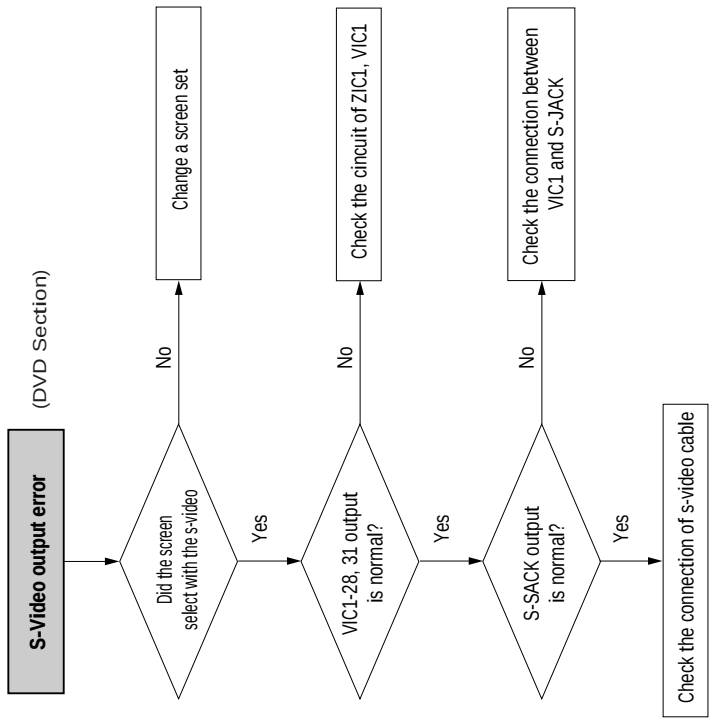

NO LD CD ON
(DVD Section)
RIC1-19, 58 is 5V?
No
Check RIC1
Yes
Divide LPR1 emitter terminal voltage and 5V real voltage difference into 10ohm.
Yes
Current exceeds 0.1A?
No
Open check in related circuit.
Yes
LD out pick-up replace.


FINE SEEK Check
(DVD Section)
MIRR signal (RIC1-27) is missing?
Yes
Check RIC1 Peripheral curcuit.
No
Track incomming is delayed?
No
Time out due to many jump counts.
Yes
TE is within 1.5V~2.5V and 3V?
No
U1-175(TRD) output is normal?
No
Check RIC1-39 terminal.
Yes
DRIC1-25,26(T+, T-) terminal outputs are normal?
No
Check U1 peripheral circuit.
Yes
Check DCON3 and pick-up.
Pick-up transfer smooth.
No
Check MECHA.
Yes
Check U1 peripheral circuit.
(TRD Waveform)
Abnormal rotation of disc motor
(DVD Section)
Input of RF SUM signal is normal? (U1-154, 155)
No
RIC1-63 output is normal?
No
Check RIC1 peripheral circuit and A, B, C, D.
Yes
Check path to RIC1 and U1.
(RF SUM Waveform)
Yes
SPD output is normal? (U1-171)
No
After resoldering U1.
Yes
Check or replace disc motor.
(SPD Waveform)


CD/VCD/DVD L/R output error
(Mixed Audio output)
(DVD Section)
Normal DATA 0 is input in AIC2-2?
No
Check U1-117 output.
(DATA 0 Waveform)
Yes
CHECK AIC2-7, 8pin output is normal?
No
Check U1-1, 3, 13~16 data/clock (CD/VCD ; 16.9344MHz, DVD ; 18.432MHz)
(Vout Waveform)
Yes
AIC4-1, 7 output is normal?
No
Check AIC4 peripheral circuit.
Yes
Base terminal level of AQ1, AQ3 are "L"?
No
Check AIC2-11, 12.
Yes
Check PCB peripheral Pattern shot.


No Tray open/close
(DVD Section)
Normal state
1,5V
U1-169 is Open ; 2,7 Close ; 0,2
No
Check U1 perpheral circuit.
Yes
Check DRIC1-17 OPEN : 3.2V CLOSE : 8.3V
No
Check DRIC1-17,18
Yes
Check DCON1 PIN 3, 4


CVBS output error
Pin of D3.3V in U1 has normal level?
No
Check PPIC3-2 3.3V or NOT
Yes
27MHz clock input is normal at pin 2, 3 in U1?
No
Check DY1.
Yes
Analog output is normal at pin 110 in U1?
No
Check the soldering of R10, R7, R8.
Yes
Analog signals are inputted normally VIC1-2?
No
Check the connection netween pin 133 in ZIC1 and VIC1.
Yes
Power is normal at VIC1-1, 34?
No
Check the connection betwen VIC1-1 and VL6
Yes
Pin 5 in VIC1 is in LOW state?
No
Check the VIC1 Periperal circuit.
Yes
Video signal of about 1V appears at output jack?
No
Check the connection between VIC1 and output jack.
Yes
Check the RCA cable.

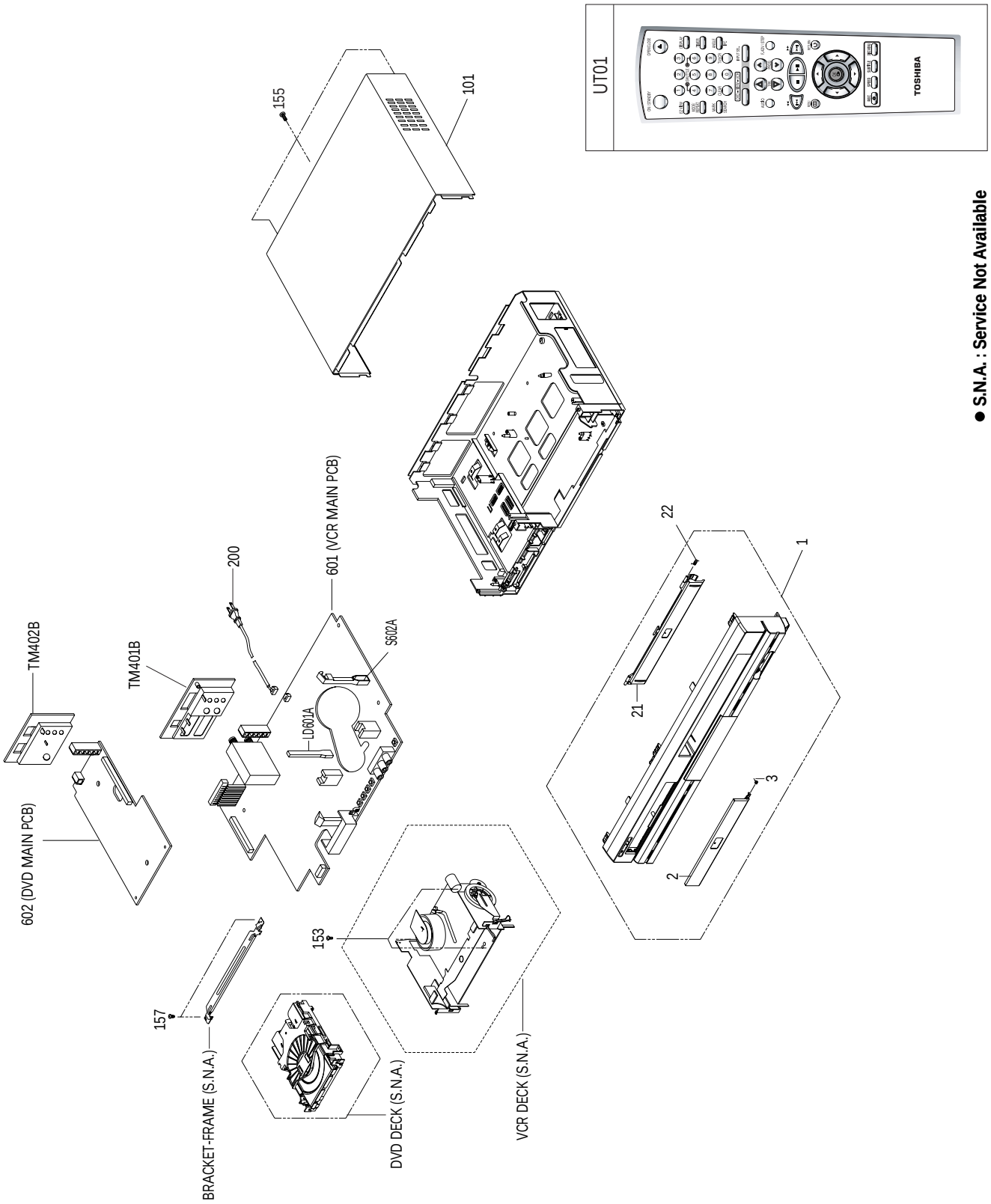

S-Video output error
(DVD Section)
Did the screen select with the s-video
No
Change a screen set
Yes
VIC1-28, 31 output is normal?
No
Check the cincuit of ZIC1, VIC1
Yes
S-SACK output is normal?
No
Check the connection between VIC1 and S-JACK
Yes
Check the connection of s-video cable

MEMO

10. Exploded View and Parts List

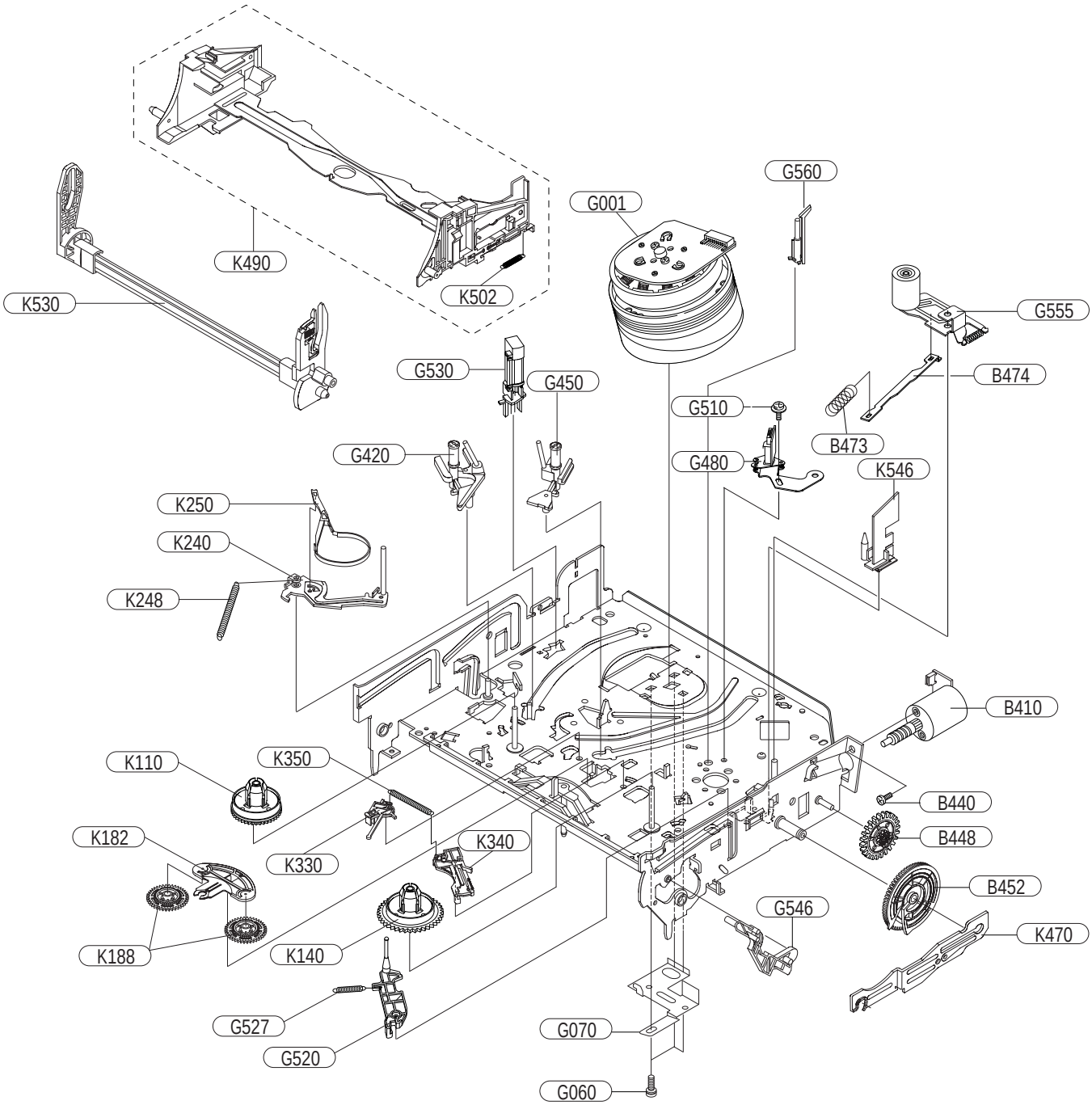
10-1 Cabinet Assembly - - -

10-1 Cabinet Assembly



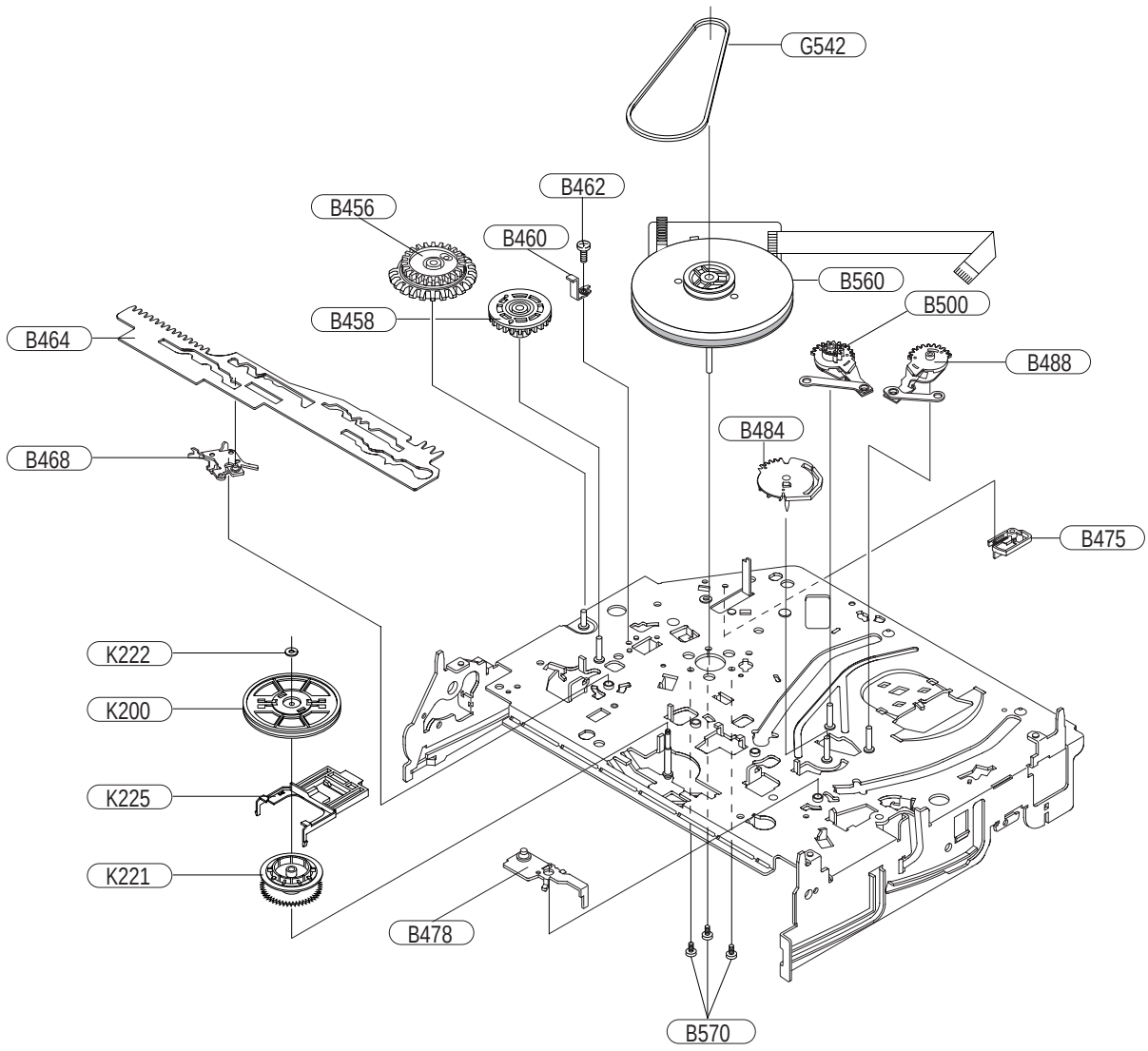
Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
1	AK97-00883J	BY731721	ASSY-PANEL FRONT;HIPS94HB GRAY,SD-14VB,0	SD-14VB Only
	AK97-00883G	BY731719	ASSY-PANEL FRONT;HIPS94HB GRAY,SD-25VL,0	SD-25VL Only
	AK97-00883H	BY731720	ASSY-PANEL FRONT;HIPS94HB GRAY,SD-25VE,0	SD-25VE Only
2	AK64-00628C	BY731702	DOOR-TRAY;SD-14VB,ABS94HB,T2.0,-,W139,L2	SD-14VB Only
	AK64-00628D	BY731703	DOOR-TRAY;SD-25VL,ABS94HB,T2.0,-,W139,L2	SD-25VL Only
	AK64-00628B	BY731701	DOOR-TRAY;SD-25VE,ABS94HB,T2.0,-,W139,L2	SD-25VE Only
3	AK64-00334A	BY734041	DOOR-SPRING;DVD-V3500,SWPB,,,,-,,	
21	AK64-00627D	BY731722	DOOR-CASSETTE;SD-25VL,ABS94HB,T2.0,-,W18	
22	AC61-62032A	BY730093	SPRING ETC-MASK;SV-C130,SUS,4.4,-,-,-,-,	
101	AK64-00536B	BY731699	CABINET-TOP;SV-DVD440,PCM,T0.5,W430,L223	
153	AC60-12126A	70790218	SCREW-MACHINE;-,-,FE,FZY,BH,-,-,4*12,-,-	
155	6003-000275	22797137	SCREW-TAPTITE;BH,+,B,M3,L10,BLK ,SWCH101	
157	6003-000277	22709856	SCREW-TAPTITE;BH,+,B,M3,L12,ZPC(YEL),SWR	
200	AC39-12022K	BY634126	CBF-POWER CORD;AT,,GP2,HOUING(2P),250V,3	SD-14VB Only
	AC39-10019A	BY634124	CBF-POWER CORD;KKP-419C,H03VVH2-F,VDE/KE	SD-25VE/SD-25VL Only
601	AC92-01553Y	BY630425	ASSY PCB-MAIN;SD-14VB/TSB,MAIN PCB ASSY	SD-14VB Only
	AC92-01553Z	BY630426	ASSY PCB-MAIN;SD-25VL/TSB,MAIN PCB ASSY	SD-25VL Only
	AC92-01553X	BY630424	ASSY PCB-MAIN;SD-25VE/TSB,MAIN PCB ASSY	SD-25VE Only
602	AK92-00550A	BY630430	ASSY PCB-DVD;SD-25VE/TSB,DVD MAIN PCB AS	
LD601A	AC61-00340A	BY530080	HOLDER-LED;X-11,POM(K300),-,-,-,NTR,-	
S602A	AC61-00341A	BY530081	HOLDER-TR;X-11,POM(K300),-,-,-,NTR,-	
TM401B	AK97-00813B	BY731718	ASSY-CONNECTOR BOARD;HIPS 94HB,SV-DVD440	
TM402B	AK61-00308A	BY731692	CONNECTOR-BOARD VCR;SV-DVD440,HIPS 94HB,	
UT01	AK59-00035A	BY634867	REMOCON-ASSY;SD25VE/TSB,SEC,187.5*54,-,4	
	AC39-00017A	BY634253	CABLE-ETC-RF(PAL);-,MALE/FEMALE,1200MM,R	SD-14VB/SD-25VL Only
	AC39-00018A	BY634851	CABLE-ETC-RF(SECAM);BOTHMALE,1200MM,R	SD-25VE Only
	AC39-20017Z	BY634852	CABLE-RCA PHONE CORD;-,-,1500M/M,SINGLEE	
	AC39-42001U	BY631148	CABLE-RCA PHONE CORD;DOUBLE,-,1.5MT,BLK,	
	AK68-00551B	BY634870	MANUAL USERS;SD-14VB,TOSHIBA,ENGLISH,-,M	SD-14VB Only
	AK68-00551A	BY634869	MANUAL USERS;SD-25VE,TOSHIBA,FR,EN,-,MOJ	SD-25VE Only
	AK68-00551C	BY634871	MANUAL USERS;SD-25VLF,TOSHIBA,EN,DE,IT,ES	SD-25VL Only

10-2 VCR Mechanical Parts (Top Side)



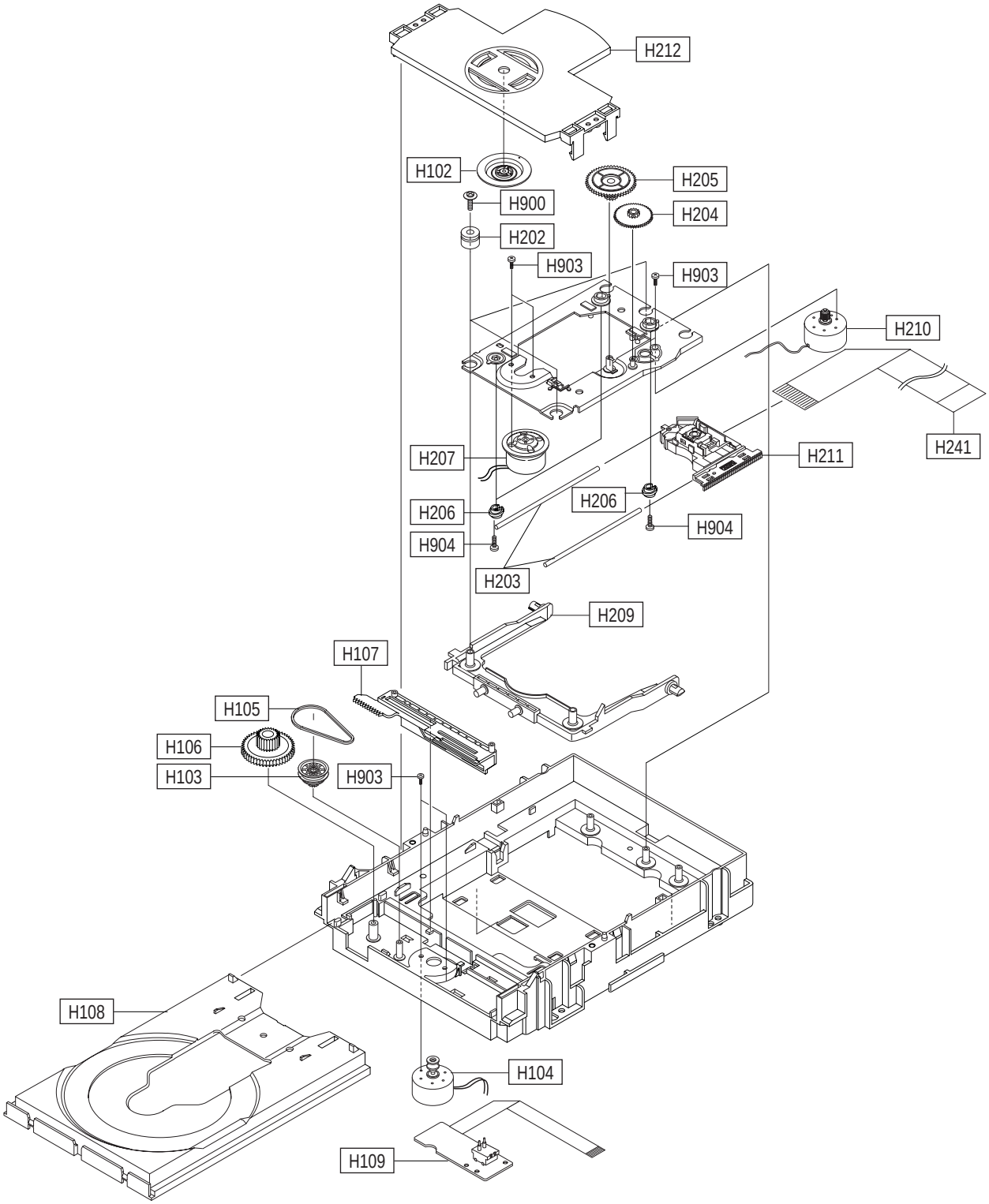
Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
B410	AC31-00018A	BY631184	MOTOR-LOADING ASSY;-,SCORPIO2(TS-10A),-,	
B440	6001-001711	BY731536	SCREW-MACHINE;PH,+,M3,L3.3,ZPC(YEL)	
B448	AC66-00008A	BY730743	GEAR-WORM WHEEL;TS-10,POM,0.8,40,-,NAT,3	
B452	AC66-00011A	BY730745	GEAR-FL CAM;TS-10,POM,0.8,59,-,BLK,48.48	
B473	AC61-00105A	BY730723	SPRING ETC-PINCH DRIVE;TS-10,SUS304-WPB,	
B474	AC61-30180A	BY730244	PLATE-JOINT;X-9,SECC20/20,T0.8,-,-,-,-	
G001	AC97-02258A	BY731659	ASSY-CLLINER;6S,CX11-SEM,FOR SLIM DECK	
G060	6006-001092	BY634416	SCREW-MACHINE;WS,PH,+,M3.0,L6.0,ZPC(YEL)	
G070	AC70-00002A	BY731640	PLATE-GND DECK;X-11,SPTE,T0.3,-,-,-,-	
G420	AC66-80142A	BY730124	SLIDER-SUPPLY ASSY;X-9,SUS,-,-,-,SIL,-	
G450	AC66-80141A	BY730123	SLIDER-TAKE UP ASSY;X-9,SUS,-,-,-,SIL,-	
G480	AC97-01660A	BY630248	ASSY-HEAD ACE;-,SCORPIO2(TS-10A),VTR-1*2	
G510	6006-001075	BY730479	SCREW-TAPTITE;WSP,PH,+,M2.6,L5.0,ZPC(YEL	
G520	AC66-00074A	BY731526	LEVER-GUIDE(#9);TS-9,PPS,-,-,-,-,BLK,KHA	
G527	AC61-60553A	BY730088	SPRING ETC-GUIDE 9;X-9,SUS304-WPB,0.25,-	
G530	AC33-00015A	BY634836	HEAD-FE;HVFHP0050A,PBT3300,2PIN,NATURA	
G546	AC66-00083A	BY731636	LEVER-FL DOOR;X-11,POM(K300),-,-,-,-,BLU	
G555	AC97-02293A	BY731528	ASSY-UNIT PINCH;SECC+SUS304,TS-10,FOR X-	
G560	AC97-02215A	BY630397	ASSY-POST #8 GUIDE;SUS303+POM(M90-44)EQ,	
K110	AC66-10267A	BY730102	REEL-DISK S;X-9,POM,-,-,-,-,-,-	
K140	AC66-10268A	BY730103	REEL-DISK T;X-9,POM,-,-,-,-,-,-	
K182	AC66-30524A	BY730112	LEVER-IDLER;-,POM,-,-,-,-,BLK,-	
K188	AC66-00039A	BY730760	GEAR-IDLE;TS-10,PET K3372,0.5,-,-,NTR,28	
K240	AC66-00035A	BY730759	LEVER-TENSION ASS'Y;TS-10,SECC E20/20+SU	
K248	AC61-00107A	BY730725	SPRING ETC-TENSION LEVER;TS-10,SUS304-WP	
K250	AC69-00104A	BY730762	BAND-BRAKE ASS'Y;TS-10,-,-,-,-,-,-	
K330	AC66-30550A	BY730121	LEVER-S.BRAKE ASSY;-,POM+SUS,-,-,-,X-9	
K340	AC66-30549A	BY730120	LEVER-T.BRAKE ASSY;-,POM+SUS,-,-,-,X-9	
K350	AC61-00106A	BY730724	SPRING ETC-BRAKE;TS-10,SUS304-WPB,-,-,-,	
K470	AC66-00020A	BY730750	SLIDER-FL DRIVE;TS-10,SECC ,T1.0,-,-,SIL	
K490	AC97-02323A	BY731660	ASSY-HOLDER FL CASSETTE;SECC+POM,X-11,Fo	
K502	AC61-60561A	BY730091	SPRING ETC-FL.LEVER-LR;X-9,SUS304 WPB,OD	
K530	AC97-02324A	BY731661	ASSY-LEVER FL ARM;SECC+POM,X-11,For X-11	
K546	AC61-50658A	BY730086	GUIDE-CASS. DOOR;X-9,POM,-,-,-,NTR	

10-3 VCR Mechanical Parts (Bottom Side)



Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
B456	AC66-00076A	BY731626	GEAR-JOINT 1;X-11,POM(K300),-,-,-,BLUE,-	
B458	AC66-00077A	BY731627	GEAR-JOINT 2;X-11,POM(K300),-,-,-,BLUE,-	
B460	AC61-00338A	BY731599	BRACKET-GEAR;X-11,SECC,T0.8,W20,L20,NTR,	
B462	6003-001450	BY731520	SCREW-TAPTITE;PH,+,S,M2.6,L5,ZPC(YEL)	
B464	AC66-00075A	BY731651	SLIDER-CAM;X-11,SECC ,T1.2,-,-,SIL,-	
B468	AC66-00017A	BY730748	LEVER-PINCH DRIVE;TS-10,SECC E20/20,1.0	
B475	AC66-00085A	BY634853	DAMPER-CAPSTAN;X-11,POM(M90-44),-,-,-,-	
B478	AC66-00016A	BY730747	LEVER-TENSION DRIVE;TS-10,SECC E20/20,1	
B484	AC66-00078A	BY731628	GEAR-LOADING DRIVE;X-11,POM(K300),-,-,-,	
B488	AC97-02195A	BY630393	ASSY-LEVER LOADING S;SECC+POM+SUS,X-11,F	
B500	AC97-02196A	BY630394	ASSY-LEVER LOADING T;SECC+POM+SUS,X-11,F	
B560	AC81-00004A	BY731689	MOTOR-CAPSTAN;THRUST END PLAY-0.2,MR-FG	
B570	6003-000108	BY731519	SCREW-TAPTITE;BH,+,B,M2.6,L6,ZPC(YEL),SW	
G542	AC66-60051A	BY730122	BELT-PULLEY;-,5CM-70,2 * 2,-,71.3,-,X-9	
K200	AC61-21012A	BY730084	HOLDER-CLUTCH ASSY;X-9,ABS,-,-,-,BLK,-	
K221	AC66-20581A	BY730111	GEAR-CENTER ASSY;X-9,POM,M=O.5,-,-,GRY,-	
K222	AC60-30306A	BY730076	FASTENER-WASHER SLIT;-,-,ID2.1,OD5.0,T0.	
K225	AC66-00006A	BY730742	LEVER-UP DOWN;TS-10,POM,-,-,-,-,NAT,-	

10-4 DVD Mechanical Parts



Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
H102	AH66-00111B	BY730227	CLAMPER-ASSY;DP-5,POM,-,-,-,-,BLK,-	
H103	AK66-00042A	BY734039	GEAR-PULLEY;DP-15,POM,-,-,-,WHT,-,-,-	
H104	AK97-00608A	BY730231	ASSY-MOTOR LOAD;-,DP-15,-	
H105	6602-001076	BY734026	BELT-RECTANGULAR;CR,T1.2,4.3%,1.2X25.1,B	
H106	AK66-00041A	BY734038	GEAR-TRAY;DP-15,POM,-,-,-,WHT,-,-,-	
H107	AK66-00045A	BY734040	SLIDER HOUSING;DP-15,POM,-,W17.8,L90,WHT	
H108	AK63-00101B	BY734030	TRAY-DISC;DP-15,ABS,-,W120,L186.3,-,GRY,	
H109	AK92-00328B	BY630429	ASSY PCB-DECK;DP-15,COMBO	
H202	AK73-00005B	BY734017	RUBBER-INSULATOR;DP-15,BUTYL,##12,HS30,H	
H203	AH61-50327A	BY734019	SHAFT-P/U;DP-3,SUS,L84.7,OD3,-,-,-	
H204	AK66-00043A	BY734005	GEAR-FEED A;DP-15,POM,-,-,-,-,-,-,-	
H205	AK66-00044A	BY734006	GEAR-FEED B;DP-15,POM,-,-,-,-,-,-,-	
H206	AK61-00032A	BY734013	HOLDER-CAM SKEW;DP-9,POM,-,-,-,BLACK,-	
H207	AK31-00014A	BY630356	MOTOR SPINDLE;DP-15,3000RPM,-,-,-,-	
H209	AK64-00491A	BY734031	CHASSIS SUB;DP-15,POM,-,-,-,-,-	
H210	AK31-00005A	BY630357	MOTOR-FEED ASSY;-,DP-9,-,-,-,-,-,-,-,-,-	
H211	AK97-00638A	BY731575	ASSY-PICK UP;-,SOH-DT2,TRINO ASSY PICK U	
H212	AK61-00253A	BY734029	HOLDER-CHUCK;DP-15,POM,-,-,-,-,-	
H241	AK41-00156B	BY734027	FFC-PU;DP-15,-,FFC,24,T0.3,RIGHT	
H900	6003-001157	BY734025	SCREW-TAPTITE;PWH,+,B,M2,L6,ZPC(YEL),SWR	
H903	6001-001370	BY731576	SCREW-MACHINE;CH,+,M1.7,L3.0,ZPC(YEL),SW	
H904	6002-001086	BY731569	SCREW-TAPPING;PH,+,B,M1.7,L5.0,ZPC(YEL),	

MEMO

11. Electrical Parts List

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
P001	**AC92-01553Y**	**BY630425**	**ASSY PCB-MAIN;SD-14VB/TSB,MAIN PCB ASSY**	**SD-14VB Only**
	AC92-01553X	**BY630424**	**ASSY PCB-MAIN;SD-25VE/TSB,MAIN PCB ASSY**	**SD-25VE Only**
	AC92-01553Z	**BY630426**	**ASSY PCB-MAIN;SD-25VL/TSB,MAIN PCB ASSY**	**SD-25VL Only**
BD1S01	AC27-92001M	70795644	COIL-INDUCTOR;RH3.5X6.5RS,BEAD(RADIAL),-	
BD1S02	AC27-92001M	70795644	COIL-INDUCTOR;RH3.5X6.5RS,BEAD(RADIAL),-	
BD1SS3	AC27-92001M	70795644	COIL-INDUCTOR;RH3.5X6.5RS,BEAD(RADIAL),-	
BD701	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
BD702	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
BD703	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
C1P101	2401-003480	BY130339	C-AL;1000UF,20%,10V,LZ,TP,10X16MM,5	
C1P102	2401-003336	BY130545	C-AL;4.7UF,20%,50V,GP,TP,5X5,2	
C1P103	2401-002026	BY130544	C-AL;10UF,20%,35V,GP,TP,5X5,2.5	
C1P104	2401-000588	BY130533	C-AL;1uF,20%,50V,GP,TP,3x5,2.5	
C1P105	2401-003336	BY130545	C-AL;4.7UF,20%,50V,GP,TP,5X5,2	
C1P106	2401-000463	72531488	C-AL;10UF,20%,35V,GP,-,5X5,5	
C1P107	2401-002299	BY130136	C-AL;4.7uF,20%,50V,GP,TP,5x7,5	
C1P109	2401-000414	BY130273	C-AL;10uF,20%,16V,GP,TP,4x7,5	
C1P110	2401-000414	BY130273	C-AL;10uF,20%,16V,GP,TP,4x7,5	
C1P111	2401-000463	72531488	C-AL;10UF,20%,35V,GP,-,5X5,5	
C1P112	2401-002299	BY130136	C-AL;4.7uF,20%,50V,GP,TP,5x7,5	
C1P113	2401-000598	BY130042	C-AL;1uF,20%,50V,GP,TP,4x7,5	
C1P114	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
C1P115	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
C1P116	2401-002299	BY130136	C-AL;4.7uF,20%,50V,GP,TP,5x7,5	
C1SD12	2305-001029	BY130226	C-FILM,LEAD-PEF;10nF,10%,630V,TP,12x9x12	
C1SD13	2301-000383	70795585	C-FILM,LEAD-PEF;10nF,5%,50V,TP,6x7x3.2mm	
C1SD16	2201-000129	BY130258	C-CERAMIC,DISC;0.1NF,10%,1KV,Y5P,TP,7X4M	
C1SF02	2401-002608	BY130473	C-AL;33uF,20%,35V,GP,TP,5x11,5	
⚠ C1SS01	2301-001718	BY130531	C-FILM,LEAD;47nF,10%,275V,BK,17*5*11mm,-	
⚠ C1SS02	2301-001718	BY130531	C-FILM,LEAD;47nF,10%,275V,BK,17*5*11mm,-	
⚠ C1SS03	2201-002044	BY130539	C-CERAMIC,DISC;0.1NF,10%,400V,Y5P,TP,8.5	
⚠ C1SS05	2201-002044	BY130539	C-CERAMIC,DISC;0.1NF,10%,400V,Y5P,TP,8.5	
⚠ C1SS06	2201-002044	BY130539	C-CERAMIC,DISC;0.1NF,10%,400V,Y5P,TP,8.5	
C1SS10	2401-003303	BY130289	C-AL;82uF,20%,400V,GP,BK,22X30,10	
C1SS11	2401-000598	BY130042	C-AL;1uF,20%,50V,GP,TP,4x7,5	
C1SS12	2401-002299	BY130136	C-AL;4.7uF,20%,50V,GP,TP,5x7,5	
C1SS15	2401-001992	70796291	C-AL;2200UF,20%,10V,WT,TP,10X20MM,5	
C1SS16	2401-003480	BY130339	C-AL;1000UF,20%,10V,LZ,TP,10X16MM,5	
C1SS17	2401-001992	70796291	C-AL;2200UF,20%,10V,WT,TP,10X20MM,5	
C1SS18	2401-001992	70796291	C-AL;2200UF,20%,10V,WT,TP,10X20MM,5	
C1SS19	2401-000385	70795431	C-AL;10uF,20%,100V,GP,TP,6.3x11,5	
C1SS21	2401-001126	BY130045	C-AL;330uF,20%,25V,WT,TP,10x12.5,5	
C1SS22	2401-001126	BY130045	C-AL;330uF,20%,25V,WT,TP,10x12.5,5	
C1SS26	2401-001126	BY130045	C-AL;330uF,20%,25V,WT,TP,10x12.5,5	
C1SS27	2301-000129	70796098	C-FILM,LEAD-PEF;100nF,5%,50V,TP,10X9X4.3	
C315	2203-000975	BY130484	C-CER,CHIP;47nF,10%,25V,X7R,TP,1608,-	
C317	2401-000588	BY130533	C-AL;1uF,20%,50V,GP,TP,3x5,2.5	
C318	2401-000588	BY130533	C-AL;1uF,20%,50V,GP,TP,3x5,2.5	
C319	2203-000843	BY130518	C-CER,CHIP;39nF,10%,25V,X7R,TP,1608,-	
C320	2203-000975	BY130484	C-CER,CHIP;47nF,10%,25V,X7R,TP,1608,-	
C321	2203-002398	BY130454	C-CER,CHIP;22nF,10%,50V,X7R,TP,1608	
C322	2401-000588	BY130533	C-AL;1uF,20%,50V,GP,TP,3x5,2.5	
C324	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C325	2401-001502	BY130535	C-AL;47uF,20%,16V,GP,TP,6.3x5,2.5	
C326	2401-000588	BY130533	C-AL;1uF,20%,50V,GP,TP,3x5,2.5	
C327	2203-001211	BY130448	C-CER,CHIP;8.2nF,10%,50V,X7R,TP,1608	
C328	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
C329	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C330	2203-000975	BY130484	C-CER,CHIP;47nF,10%,25V,X7R,TP,1608,-	
C331	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	SD-25VE Only
C332	2203-000975	BY130484	C-CER,CHIP;47nF,10%,25V,X7R,TP,1608,-	
C333	2401-000408	BY130395	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	
C334	2203-000975	BY130484	C-CER,CHIP;47nF,10%,25V,X7R,TP,1608,-	
C334A	2203-000236	BY130439	C-CER,CHIP;0.1NF,5%,50V,C0G,TP,1608	
C335	2203-001652	BY130452	C-CER,CHIP;470nF,+80-20%,16V,Y5V,TP,1608	
C336	2203-000975	BY130484	C-CER,CHIP;47nF,10%,25V,X7R,TP,1608,-	
C337	2203-001652	BY130452	C-CER,CHIP;470nF,+80-20%,16V,Y5V,TP,1608	
C338	2203-000609	70795974	C-CER,CHIP;22nF,10%,50V,X7R,TP,2012	
C339	2401-000408	BY130395	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	
C340	2401-001226	BY130016	C-AL;4.7uF,20%,16V,BP,TP,4x7,5mm	
C341	2401-003107	BY130282	C-AL;47uF,20%,16V,GP,TP,5x7,5	
C342	2202-002037	BY130027	C-CERAMIC,MLC-AXIAL;100nF,80-20%,50V,Y5V	
C343	2203-005065	BY130479	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,-,1608	
C344	2203-000315	BY130441	C-CER,CHIP;0.12NF,5%,50V,C0G,TP,1608	
C345	2203-001607	BY130451	C-CER,CHIP;0.22nF,5%,50V,NP0,-,1608	
C347	2203-005065	BY130479	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,-,1608	
C348	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C349	2203-005065	BY130479	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,-,1608	
C350	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C351	2401-003107	BY130282	C-AL;47uF,20%,16V,GP,TP,5x7,5	
C352	2401-000588	BY130533	C-AL;1uF,20%,50V,GP,TP,3x5,2.5	
C353	2401-000588	BY130533	C-AL;1uF,20%,50V,GP,TP,3x5,2.5	
C354	2401-001502	BY130535	C-AL;47uF,20%,16V,GP,TP,6.3x5,2.5	
C355	2203-000975	BY130484	C-CER,CHIP;47nF,10%,25V,X7R,TP,1608,-	
C355A	2203-000236	BY130439	C-CER,CHIP;0.1NF,5%,50V,C0G,TP,1608	
C380	2203-002398	BY130454	C-CER,CHIP;22nF,10%,50V,X7R,TP,1608	
C384	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C385	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
C392	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C3A01	2401-002299	BY130136	C-AL;4.7uF,20%,50V,GP,TP,5x7,5	
C3A02	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
C3A08	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C3A09	2203-001103	BY130447	C-CER,CHIP;6.8nF,10%,50V,X7R,TP,1608,-	
C3A10	2203-001211	BY130448	C-CER,CHIP;8.2nF,10%,50V,X7R,TP,1608	
C3A11	2301-001680	BY130542	C-FILM,PEF;15nF,5%,50V,TP,6.3x3x7mm,-	
C3A12	2401-002095	BY130048	C-AL;47uF,20%,25V,GP,TP,6.3x5,5	
C3A14	2202-000263	BY130172	C-CERAMIC,MLC-AXIAL;470pF,10%,50V,Y5P,TP	
C3A15	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C3A16	2401-002299	BY130136	C-AL;4.7uF,20%,50V,GP,TP,5x7,5	
C3A17	2401-000414	BY130273	C-AL;10uF,20%,16V,GP,TP,4x7,5	
C3A18	2203-001126	BY130478	C-CER,CHIP;0.68nF,10%,50V,X7R,TP,1608	
C3A21A	2203-001554	BY130450	C-CER,CHIP;1.8nF,10%,50V,X7R,TP,1608	
C3A23	2401-002069	BY130245	C-AL;33uF,20%,16V,GP,TP,6.3x5,5	
C3A24	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C3A29	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C3A30	2401-001502	BY130535	C-AL;47uF,20%,16V,GP,TP,6.3x5,2.5	
C3A40	2401-000414	BY130273	C-AL;10uF,20%,16V,GP,TP,4x7,5	
C3A41	2401-000588	BY130533	C-AL;1uF,20%,50V,GP,TP,3x5,2.5	
C3A70	2203-001126	BY130478	C-CER,CHIP;0.68nF,10%,50V,X7R,TP,1608	
C3A71	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
C3S01	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	SD-25VE Only
C3S02	2401-000598	BY130042	C-AL;1uF,20%,50V,GP,TP,4x7,5	SD-25VE Only
C3S03	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	SD-25VE Only
C3S04	2401-000598	BY130042	C-AL;1uF,20%,50V,GP,TP,4x7,5	SD-25VE Only
C3S05	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	SD-25VE Only
C3S06	2401-001324	BY130534	C-AL;0.47UF,20%,50V,GP,BK,3X5,2.5	SD-25VE Only
C3S07	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	SD-25VE Only

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
C3S08	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	SD-25VE Only
C3S09	2401-001324	BY130534	C-AL;0.47UF,20%,50V,GP,BK,3X5,2.5	SD-25VE Only
C3S10	2401-003107	BY130282	C-AL;47uF,20%,16V,GP,TP,5x7,5	SD-25VE Only
C3S11	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	SD-25VE Only
C3S12A	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	SD-25VE Only
C3S14	2401-000665	BY130424	C-AL;2.2uF,20%,50V,GP,TP,3.5x5,5	SD-25VE Only
C3S14A	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	SD-25VE Only
C3S15	2203-000440	BY130462	C-CER,CHIP;1nF,10%,50V,X7R,TP,1608,-	SD-25VE Only
C401	2401-003107	BY130282	C-AL;47uF,20%,16V,GP,TP,5x7,5	
C402	2203-002398	BY130454	C-CER,CHIP;22nF,10%,50V,X7R,TP,1608	
C403	2401-001502	BY130535	C-AL;47uF,20%,16V,GP,TP,6.3x5,2.5	
C404	2401-001077	BY130431	C-AL;330nF,20%,50V,GP,TP,4x7mm,5mm	
C405	2401-002438	BY130472	C-AL;47uF,20%,50V,WT,TP,6.3x11,5	
C406	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C407	2401-003107	BY130282	C-AL;47uF,20%,16V,GP,TP,5x7,5	SD-14VB/SD-25VL Only
C409	2401-002299	BY130136	C-AL;4.7uF,20%,50V,GP,TP,5x7,5	SD-14VB/SD-25VL Only
C410	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C4N01	2203-000140	BY130459	C-CER,CHIP;1.5nF,10%,50V,X7R,TP,1608,-	
C4N02	2401-000408	BY130395	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	
C4N03	2203-001607	BY130451	C-CER,CHIP;0.22nF,5%,50V,NP0,-,1608	
C4N04	2401-000665	BY130424	C-AL;2.2uF,20%,50V,GP,TP,3.5x5,5	
C4N05	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C4N06	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C4N07	2203-001656	BY130453	C-CER,CHIP;0.47nF,5%,50V,NP0,TP,1608	
C4N08	2203-000140	BY130459	C-CER,CHIP;1.5nF,10%,50V,X7R,TP,1608,-	
C4N09	2401-000408	BY130395	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	
C4N10	2401-000408	BY130395	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	
C4N11	2401-002186	BY130536	C-AL;3.3UF,20%,50V,GP,BK,4X5,2.5	
C4N12	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C4N13	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C4N14	2401-000408	BY130395	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	
C4N15	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C4N16	2401-001502	BY130535	C-AL;47uF,20%,16V,GP,TP,6.3x5,2.5	
C4N17	2203-001656	BY130453	C-CER,CHIP;0.47nF,5%,50V,NP0,TP,1608	
C4N18	2203-001656	BY130453	C-CER,CHIP;0.47nF,5%,50V,NP0,TP,1608	
C4N19	2203-000998	BY130446	C-CER,CHIP;0.047NF,5%,50V,C0G,TP,1608	
C4N21	2201-002069	BY130261	C-CERAMIC,DISC;0.0015NF,0.25PF,50V,C0G,T	
C4N22	2201-002069	BY130261	C-CERAMIC,DISC;0.0015NF,0.25PF,50V,C0G,T	
C4N23	2401-000598	BY130042	C-AL;1uF,20%,50V,GP,TP,4x7,5	
C4N24	2401-000598	BY130042	C-AL;1uF,20%,50V,GP,TP,4x7,5	
C4N25	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C4N30	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C501	2401-000408	BY130395	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	
C502	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C503	2401-000909	BY130494	C-AL;22uF,20%,16V,GP,TP,5x5,2.5	
C504	2401-000408	BY130395	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	
C505	2401-001249	BY130496	C-AL;4.7uF,20%,35V,GP,TP,4x5,2.5	
C506	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C507	2401-000909	BY130494	C-AL;22uF,20%,16V,GP,TP,5x5,2.5	
C508	2203-000888	BY130483	C-CER,CHIP;4.7nF,10%,50V,X7R,TP,1608	
C510	2401-001502	BY130535	C-AL;47uF,20%,16V,GP,TP,6.3x5,2.5	
C511	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C513	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C517	2203-000888	BY130483	C-CER,CHIP;4.7nF,10%,50V,X7R,TP,1608	
C518	2401-000909	BY130494	C-AL;22uF,20%,16V,GP,TP,5x5,2.5	
C519	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C520	2401-001249	BY130496	C-AL;4.7uF,20%,35V,GP,TP,4x5,2.5	
C521	2401-000408	BY130395	C-AL;10uF,20%,16V,GP,TP,3.5x5,2.5	
C522	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C523	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C524	2401-001249	BY130496	C-AL;4.7uF,20%,35V,GP,TP,4x5,2.5	

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C525	2401-001249	BY130496	C-AL;4.7uF,20%,35V,GP,TP,4x5,2.5	
C526	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
C527	2202-000797	70795075	C-CERAMIC,MLC-AXIAL;10NF,30%,16V,Y5S,TP,	
C529	2401-001250	70796211	C-AL;4.7uF,20%,35V,GP,TP,4x5,5	
C530	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C535	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C536	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C537	2401-000665	BY130424	C-AL;2.2uF,20%,50V,GP,TP,3.5x5,5	
C538	2401-002569	BY130537	C-AL;2.2uF,20%,50V,GP,TP,4x5,2.5	
C539	2401-001250	70796211	C-AL;4.7uF,20%,35V,GP,TP,4x5,5	
C540	2401-001250	70796211	C-AL;4.7uF,20%,35V,GP,TP,4x5,5	
C541	2401-000588	BY130533	C-AL;1uF,20%,50V,GP,TP,3x5,2.5	
C601	2203-002398	BY130454	C-CER,CHIP;22nF,10%,50V,X7R,TP,1608	
C602	2401-002095	BY130048	C-AL;47uF,20%,25V,GP,TP,6.3x5,5	
C605	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C606	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C607	2401-000118	70796210	C-AL;1000uF,20%,10V,GP,TP,10x12.5,5	
C607A	2401-003107	BY130282	C-AL;47uF,20%,16V,GP,TP,5x7,5	
C610	2202-002037	BY130027	C-CERAMIC,MLC-AXIAL;100nF,80-20%,50V,Y5V	
C618	2401-000360	BY130317	C-AL;100uF,20%,50V,GP,TP,8x11.5,5	
C618A	2401-002095	BY130048	C-AL;47uF,20%,25V,GP,TP,6.3x5,5	
C619	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C620	2401-001543	BY130543	C-AL;47uF,20%,25V,GP,TP,6.3x5mm,2.5	
C621	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C623	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C626	2203-000626	BY130444	C-CER,CHIP;0.022nF,5%,50V,C0G,TP,1608	
C627	2203-000626	BY130444	C-CER,CHIP;0.022nF,5%,50V,C0G,TP,1608	
C628	2203-000681	BY130445	C-CER,CHIP;0.027NF,5%,50V,C0G,TP,1608	
C633	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C635	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	
C636	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	
C637	2203-001656	BY130453	C-CER,CHIP;0.47nF,5%,50V,NP0,TP,1608	
C638	2401-002196	70796152	C-AL;4.7uF,20,25V,GP,TP,4X5,5MM,-	
C639	2203-000236	BY130439	C-CER,CHIP;0.1NF,5%,50V,C0G,TP,1608	
C640	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C641	2401-003221	BY130499	C-AL;100uF,20%,16V,GP,TP,8X5,2.5	
C642	2401-002095	BY130048	C-AL;47uF,20%,25V,GP,TP,6.3x5,5	
C645	2203-000357	BY130442	C-CER,CHIP;0.15NF,5%,50V,C0G,TP,1608	
C646	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C659A	2203-001140	BY130526	C-CER,CHIP;68nF,10%,16V,X7R,TP,1608	
C661	2202-002055	BY130286	C-CERAMIC,MLC-AXIAL;47nF,+80-20%,50V,Y5V	
C688	2401-003107	BY130282	C-AL;47uF,20%,16V,GP,TP,5x7,5	
C691	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C695	2203-000357	BY130442	C-CER,CHIP;0.15NF,5%,50V,C0G,TP,1608	
C696	2203-000236	BY130439	C-CER,CHIP;0.1NF,5%,50V,C0G,TP,1608	
C6P01	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C6P04	2203-000681	BY130445	C-CER,CHIP;0.027NF,5%,50V,C0G,TP,1608	
C6P05	2203-000681	BY130445	C-CER,CHIP;0.027NF,5%,50V,C0G,TP,1608	
C6P06	2203-000440	BY130462	C-CER,CHIP;1nF,10%,50V,X7R,TP,1608,-	
C6P07	2401-002299	BY130136	C-AL;4.7uF,20%,50V,GP,TP,5x7,5	
C6P08	2203-001071	BY130465	C-CER,CHIP;0.056NF,5%,50V,C0G,TP,1608	
C6P10	2401-000598	BY130042	C-AL;1uF,20%,50V,GP,TP,4x7,5	
C6P11	2401-000598	BY130042	C-AL;1uF,20%,50V,GP,TP,4x7,5	
C6P12	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
C6P13	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C6P15	2203-001140	BY130526	C-CER,CHIP;68nF,10%,16V,X7R,TP,1608	
C701	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
C702	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C703	2203-000440	BY130462	C-CER,CHIP;1nF,10%,50V,X7R,TP,1608,-	
C706	2203-000239	70795969	C-CER,CHIP;0.1NF,5%,50V,C0G,TP,2012	
C707	2401-001992	70796291	C-AL;2200UF,20%,10V,WT,TP,10X20MM,5	

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
C708A	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C712	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	
C714	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	
C812	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
C813	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
C814	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
C815	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
C816	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
C817	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C818	2203-000783	BY130435	C-CER,CHIP;0.33NF,5%,50V,C0G,TP,1608	
C819	2203-000783	BY130435	C-CER,CHIP;0.33NF,5%,50V,C0G,TP,1608	
C820	2203-000783	BY130435	C-CER,CHIP;0.33NF,5%,50V,C0G,TP,1608	
C821	2203-000783	BY130435	C-CER,CHIP;0.33NF,5%,50V,C0G,TP,1608	
C822A	2203-000236	BY130439	C-CER,CHIP;0.1NF,5%,50V,C0G,TP,1608	
C823	2203-000783	BY130435	C-CER,CHIP;0.33NF,5%,50V,C0G,TP,1608	
C824	2203-000783	BY130435	C-CER,CHIP;0.33NF,5%,50V,C0G,TP,1608	
C825	2203-000783	BY130435	C-CER,CHIP;0.33NF,5%,50V,C0G,TP,1608	
C826	2203-000783	BY130435	C-CER,CHIP;0.33NF,5%,50V,C0G,TP,1608	
C835	2401-001479	BY130015	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,5	
C837	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
C840	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C851	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
C852	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
C853	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	
C854	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	
C857	2203-000888	BY130483	C-CER,CHIP;4.7nF,10%,50V,X7R,TP,1608	
C858	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
C890	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
CN01	3711-005565	BY634863	CONNECTOR-HEADER;NOWALL,24P,1R,2mm,STRAI	
CN1SS1	3711-000203	BY634858	CONNECTOR-HEADER;1WALL,2P,1R,7.92MM,STRA	
CN301	3708-000391	70796387	CONNECTOR-FPC/FFC/PIC;10P,1.25MM,STRAIGH	
CN3A01	3708-001165	BY634023	CONNECTOR-FPC/FFC/PIC;6P,1.25MM,STRAIGHT	
CN3A02	AC37-00028A	BY634831	CONNECTOR-SOCKET;-,X-11,T9.0,W8.5,PBT NT	
CN3A1S	3809-001206	BY634415	CABLE-FLAT;30V,-20to+80C,140mm,6P,1.25mm	
CN604	AC37-00027A	BY634826	CONNECTOR-HEADER;20045WS,X-11,T8.5,W17.4	
CN701	3710-001918	BY634860	CONNECTOR-SOCKET;6P,1R,2MM,ANGLE,SN	
CN701A	3711-005312	BY634862	CONNECTOR-HEADER;3WALL,6P,1R,2MM,STRAIGH	
D1P104	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
D1P105	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
D1P106	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
D1P107	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
D1P108	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
D1P130	0402-000127	70796385	DIODE-RECTIFIER;1N4002,100V,1A,DO-41,TP	
D1SF01	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
D1SF02	0402-001195	BY430011	DIODE-RECTIFIER;F1T4,400V,1A,DO-204AC,TP	
D1SS01	0402-001196	BY430012	DIODE-RECTIFIER;1T5,600V,1A,TS-1,TP	
D1SS02	0402-001196	BY430012	DIODE-RECTIFIER;1T5,600V,1A,TS-1,TP	
D1SS03	0402-001196	BY430012	DIODE-RECTIFIER;1T5,600V,1A,TS-1,TP	
D1SS04	0402-001196	BY430012	DIODE-RECTIFIER;1T5,600V,1A,TS-1,TP	
D1SS11	0402-000012	BY430047	DIODE-RECTIFIER;UF4007,1KV,1A,DO-41,TP	
D1SS12	0404-001225	BY430112	DIODE-SCHOTTKY;SRAF560,60V,5000mA,ITO-22	
D1SS13	0404-001225	BY430112	DIODE-SCHOTTKY;SRAF560,60V,5000mA,ITO-22	
D1SS14	0404-001225	BY430112	DIODE-SCHOTTKY;SRAF560,60V,5000mA,ITO-22	
D1SS15	0402-001195	BY430011	DIODE-RECTIFIER;F1T4,400V,1A,DO-204AC,TP	
D1SS16	0402-001194	BY430010	DIODE-RECTIFIER;SHG2D,200V,2A,-,TP	
D1SS19	0402-001195	BY430011	DIODE-RECTIFIER;F1T4,400V,1A,DO-204AC,TP	
D301	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
D302	0402-000127	70796385	DIODE-RECTIFIER;1N4002,100V,1A,DO-41,TP	
D303	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
D401	0402-000127	70796385	DIODE-RECTIFIER;1N4002,100V,1A,DO-41,TP	
D4N01	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	

	Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
	D4N02	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
	D501	0402-000127	70796385	DIODE-RECTIFIER;1N4002,100V,1A,DO-41,TP	
	D603	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
	D620	0402-000127	70796385	DIODE-RECTIFIER;1N4002,100V,1A,DO-41,TP	
	D688	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
	D692	0402-000127	70796385	DIODE-RECTIFIER;1N4002,100V,1A,DO-41,TP	
	D6P01	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
	D701	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
	D702	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
	D703	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
	D704	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
	D705	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
	D805	0401-000101	70795150	DIODE-SWITCHING;1N4148,75V,150MA,DO-35,T	
	DT701	AC07-00069A	BY630422	LED DISPLAY;BCD-9027E,SV-DVD440,5-DIGIT,	
	FL3A01	2702-000166	70795862	INDUCTOR-RADIAL;47uH,5%,6.0x6.4mm	
⚠	IC1S02	0604-001028	BY530004	PHOTO-COUPLER;TR,50-600%,250mW,DIP-4,ST	
	IC1S03	AC14-12006D	70795271	IC;KA431Z,TO-92,TAPING	
	IC1SS2	1203-002805	BY631237	IC-PWM CONTROLLER;ICE2BS01,PDIP,8P,9.52X	
	IC301	1204-002140	BY631205	IC-VIDEO PROCESS;LA71750EM-MPB-E,QFP,100	
	IC3S01	1204-001921	BY631190	IC-CHROMA;LA70100M,SOP,30P,375MIL,PLASTI	SD-25VE Only
	IC4N01	1204-001765	BY631149	IC-AUDIO PROCESSOR;MSP3417D(PQFP),PQFP,4	SD-14VB/SD-25VL Only
		1204-001765	BY631149	IC-AUDIO PROCESSOR;MSP3417D(PQFP),PQFP,4	SD-25VE Only
	IC501	1204-001920	BY631189	IC-AUDIO PROCESSOR;LA72646M,QFP,80P,14x1	
	IC601	AC09-00506A	BY631293	IC MICOM;N128-B64-3BA,SV-DVD440-02,100P	
	IC604	AC14-12006C	70795269	IC;KA7533,DIP,-	
	IC605	1103-001106	BY6313313	IC-EEPROM;24C080,1Kx8Bit,DIP,8P,9.6x6.4m	
	IC6P01	1204-001794	BY631157	IC-AUDIO PROCESSOR;LC74775NM-9808,MPF,30	
	IC701	1003-001561	BY631280	IC-LED DRIVER;PT6961,SOP,32P,300MIL,-,40	
	IC802	0801-002741	BY631218	IC-CMOS LOGIC;BU4053BCFV,MUX,SSOP,16P,17	
	J03C	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
	J11C	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	SD-25VE Only
	J330	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
	J50A	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
	J905	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
	J910	2007-000029	70795513	R-CHIP;0ohm,5%,1/8W,TP,2012	
	J911	2007-000029	70795513	R-CHIP;0ohm,5%,1/8W,TP,2012	
	J912	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
	J913	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
	J914	2007-000029	70795513	R-CHIP;0ohm,5%,1/8W,TP,2012	
	JC801	3722-001573	BY634413	JACK-SCART;42P/2R,-,SN,BLK/BLU,#20-28	
	JC802	AC37-22002N	BY634766	JACK-PIN;3.2mm,DPAE-9836,3P(1),HI-FI,SV	
	JK701	3722-001943	BY634864	JACK-PIN;3P,8.3PI,NI,BLK,-	
	L1P102	AC27-12001N	70796213	COIL CHOKE;10UH-15%,RA,K-30,Q80,150KHZ,-	
⚠	L1SS01	AC29-00002A	BY634272	FILTER LINE NOISE;-,30mH,-,-,BLF-2116	
	L1SS02	AC29-00003A	BY330065	FILTER LINE NOISE;-,20mH MIN,-,-,-	
	L1SS03	AC27-12001N	70796213	COIL CHOKE;10UH-15%,RA,K-30,Q80,150KHZ,-	
	L1SS04	AC27-12001N	70796213	COIL CHOKE;10UH-15%,RA,K-30,Q80,150KHZ,-	
	L1SS05	AC27-12001N	70796213	COIL CHOKE;10UH-15%,RA,K-30,Q80,150KHZ,-	
	L301	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
	L301A	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
	L302	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
	L303	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
	L304	3301-000297	BY330019	BEAD-AXIAL;25ohm,3.6x1.2x5.7mm,,TP,,,	
	L370	2701-000113	70795159	INDUCTOR-AXIAL;100UH,5%,2534	
	L3A01	2702-000120	70795171	INDUCTOR-RADIAL;15000uH,5%,6.2x7.4mm	
	L3A02	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
	L3A03	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
	L3A70	2702-000120	70795171	INDUCTOR-RADIAL;15000uH,5%,6.2x7.4mm	
	L401	AC27-12001N	70796213	COIL CHOKE;10UH-15%,RA,K-30,Q80,150KHZ,-	
	L4N01	2702-000160	BY330066	INDUCTOR-RADIAL;4.7uH,10%,6.0x6.4mm	
	L4N02	2702-000106	70796003	INDUCTOR-RADIAL;100uH,10%,6.2x7.4mm	

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
L4N03	2702-000160	BY330066	INDUCTOR-RADIAL;4.7uH,10%,6.0x6.4mm	
L4N04	3301-000297	BY330019	BEAD-AXIAL;25ohm,3.6x1.2x5.7mm,,TP,,,	
L603	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
L605	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
L6P01	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
L6P03	2701-000160	70795162	INDUCTOR-AXIAL;22uH,5%,2434	
L6P05	2701-000165	BY330052	INDUCTOR-AXIAL;27uH,5%,2434	
L701	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
L702	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
L803	2701-000181	BY330053	INDUCTOR-AXIAL;33uH,5%,2434	
L804	2701-000181	BY330053	INDUCTOR-AXIAL;33uH,5%,2434	
L805	2701-000181	BY330053	INDUCTOR-AXIAL;33uH,5%,2434	
L806	2701-000181	BY330053	INDUCTOR-AXIAL;33uH,5%,2434	
L807	2701-000181	BY330053	INDUCTOR-AXIAL;33uH,5%,2434	
L808	2701-000181	BY330053	INDUCTOR-AXIAL;33uH,5%,2434	
L809	2701-000181	BY330053	INDUCTOR-AXIAL;33uH,5%,2434	
L810	2701-000181	BY330053	INDUCTOR-AXIAL;33uH,5%,2434	
L811	2701-000181	BY330053	INDUCTOR-AXIAL;33uH,5%,2434	
L812	2701-000181	BY330053	INDUCTOR-AXIAL;33uH,5%,2434	
L814	AC27-92001M	70795644	COIL-INDUCTOR;RH3.5X6.5RS,BEAD(RADIAL),-	
L890	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	
LD601	0601-001817	BY430114	LED-IR;SIDE-VIEW,2.5mm,75mW,6V,940,TR	
P021	AK61-00308A	BY731692	CONNECTOR-BOARD VCR;SV-DVD440,HIPS 94HB,	
⚠ PT1S01	AC26-00012J	BY330091	TRANS SWITCHING;EER-3126,SLV-D950E,-,-,-	
PT601	0604-001275	BY631213	PHOTO-INTERRUPTER;-,-,-,SNAP,TR	
PT602	0604-001275	BY631213	PHOTO-INTERRUPTER;-,-,-,SNAP,TR	
Q1P101	0501-000362	BY530008	TR-SMALL SIGNAL;KSC2328A-Y,NPN,1000MW,TO	
Q1P102	0504-000142	70693084	TR-DIGITAL;KSR2001,PNP,300MW,4.7K/4.7K,T	
Q1P103	0501-000398	70795136	TR-SMALL SIGNAL;KSC945,NPN,250mW,TO-92,T	
Q1P104	0501-000362	BY530008	TR-SMALL SIGNAL;KSC2328A-Y,NPN,1000MW,TO	
Q1P105	0501-000362	BY530008	TR-SMALL SIGNAL;KSC2328A-Y,NPN,1000MW,TO	
Q1P106	0501-000362	BY530008	TR-SMALL SIGNAL;KSC2328A-Y,NPN,1000MW,TO	
Q1P107	0501-000362	BY530008	TR-SMALL SIGNAL;KSC2328A-Y,NPN,1000MW,TO	
Q1P108	0504-000142	70693084	TR-DIGITAL;KSR2001,PNP,300MW,4.7K/4.7K,T	
Q1P109	0501-000398	70795136	TR-SMALL SIGNAL;KSC945,NPN,250mW,TO-92,T	
Q1P110	0501-000362	BY530008	TR-SMALL SIGNAL;KSC2328A-Y,NPN,1000MW,TO	
Q1P111	0501-000362	BY530008	TR-SMALL SIGNAL;KSC2328A-Y,NPN,1000MW,TO	
Q302	0501-000341	BY530073	TR-SMALL SIGNAL;KSC1623-L,NPN,200mW,SOT-	SD-25VE Only
Q351	0501-000002	BY430105	TR-SMALL SIGNAL;KSA812,PNP,150MW,SOT-23,	
Q3A01	0501-000398	70795136	TR-SMALL SIGNAL;KSC945,NPN,250mW,TO-92,T	
Q3A02	0501-000303	70795134	TR-SMALL SIGNAL;KSA733,PNP,250mW,TO-92,T	
Q3A03	0501-000442	70795142	TR-SMALL SIGNAL;KTC3203-Y,NPN,400mW,T0-9	
Q3A04	0501-000442	70795142	TR-SMALL SIGNAL;KTC3203-Y,NPN,400mW,T0-9	
Q3A05	0501-000442	70795142	TR-SMALL SIGNAL;KTC3203-Y,NPN,400mW,T0-9	
Q3A06	0501-000002	BY430105	TR-SMALL SIGNAL;KSA812,PNP,150MW,SOT-23,	
Q401	0501-000002	BY430105	TR-SMALL SIGNAL;KSA812,PNP,150MW,SOT-23,	SD-14VB/SD-25VL Only
Q601	0504-000129	70795815	TR-DIGITAL;KSR1104,NPN,200mW,47K/47K,SOT	
Q6P01	0501-000303	70795134	TR-SMALL SIGNAL;KSA733,PNP,250mW,TO-92,T	
Q6P02	0501-000303	70795134	TR-SMALL SIGNAL;KSA733,PNP,250mW,TO-92,T	
Q6P04	0501-000398	70795136	TR-SMALL SIGNAL;KSC945,NPN,250mW,TO-92,T	
Q802	0504-000119	BY530014	TR-DIGITAL;KSR1004,NPN,300MW,47K/47K,TO-	
Q803	0504-000129	70795815	TR-DIGITAL;KSR1104,NPN,200mW,47K/47K,SOT	
Q804	0504-000142	70693084	TR-DIGITAL;KSR2001,PNP,300MW,4.7K/4.7K,T	
Q806	0504-000152	BY530078	TR-DIGITAL;KSR2101,PNP,200mW,4.7K/4.7K,S	
Q808	0504-000119	BY530014	TR-DIGITAL;KSR1004,NPN,300MW,47K/47K,TO-	
Q809	0501-000341	BY530073	TR-SMALL SIGNAL;KSC1623-L,NPN,200mW,SOT-	
Q810	0501-000341	BY530073	TR-SMALL SIGNAL;KSC1623-L,NPN,200mW,SOT-	
Q811	0501-000341	BY530073	TR-SMALL SIGNAL;KSC1623-L,NPN,200mW,SOT-	
Q891A	0501-000398	70795136	TR-SMALL SIGNAL;KSC945,NPN,250mW,TO-92,T	SD-14VB/SD-25VL Only
Q891B	0501-000398	70795136	TR-SMALL SIGNAL;KSC945,NPN,250mW,TO-92,T	SD-14VB/SD-25VL Only
R1P101	2001-000855	BY230025	R-CARBON;560OHM,5%,1/4W,AA,TP,2.4X6.4MM	

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
R1P103	2007-000402	BY230314	R-CHIP;150ohm,5%,1/10W,TP,1608	
R1P104	2001-000449	70795020	R-CARBON;2.2KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R1P105	2001-000969	70795054	R-CARBON;75OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R1P109	2001-000362	70796067	R-CARBON;150OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R1P10B	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R1P110	2001-000449	70795020	R-CARBON;2.2KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R1P111	2001-000062	70796173	R-CARBON;470OHM,5%,1/4W,AA,TP,2.4X6.4MM	
R1P112	2001-000302	70795003	R-CARBON;10OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R1P122	2007-000134	BY230298	R-CHIP;33Kohm,5%,1/10W,TP,1608	
R1SD11	2006-000273	70796087	R-CEMENT;27KOHM,5%,2W,CA,BK,6.4X6.5X18M	
R1SD13	2006-000273	70796087	R-CEMENT;27KOHM,5%,2W,CA,BK,6.4X6.5X18M	
R1SD14	2001-000598	70795320	R-CARBON;3.3OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R1SF05	2001-000527	70795018	R-CARBON;22OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R1SF06	2004-000459	70795638	R-METAL;2.2Kohm,1%,1/8W,AA,TP,1.8x3.2m	
R1SF07	2003-000105	BY230146	R-METAL OXIDE;0.33ohm,5%,2W,AD,TP,6x16mm	
R1SQ11	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R1SR01	2001-000548	70795027	R-CARBON;270KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R1SR02	2001-000548	70795027	R-CARBON;270KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R1SR03	2001-000548	70795027	R-CARBON;270KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R1SS01	2006-000262	BY230170	R-CEMENT;2.7ohm,10%,2W,CB,TP,7.5x11x20.	
R1SS08	2001-000793	70796129	R-CARBON;47OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R1SS31	2001-000780	70795039	R-CARBON;470OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R1SS32	2001-000429	70795005	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R1SS33	2001-000429	70795005	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R1SS34	2004-000869	70795640	R-METAL;3Kohm,1%,1/8W,AA,TP,1.8x3.2mm	
R1SS35	2004-000459	70795638	R-METAL;2.2Kohm,1%,1/8W,AA,TP,1.8x3.2m	
R315	2007-000122	BY230294	R-CHIP;1.2Kohm,5%,1/10W,TP,1608	
R316	2007-001179	BY230305	R-CHIP;8.2Kohm,5%,1/10W,TP,1608	
R320	2007-000458	BY230372	R-CHIP;18Kohm,5%,1/10W,TP,1608	
R321	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R322	2007-000458	BY230372	R-CHIP;18Kohm,5%,1/10W,TP,1608	
R323	2007-000125	BY230296	R-CHIP;3.9Kohm,5%,1/10W,TP,1608	
R324	2007-000079	BY230280	R-CHIP;1.8Kohm,5%,1/10W,TP,1608	SD-25VE Only
R325	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R326	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R327	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
R328	2007-000122	BY230294	R-CHIP;1.2Kohm,5%,1/10W,TP,1608	
R329	2007-000081	BY230281	R-CHIP;2.7Kohm,5%,1/10W,TP,1608	
R330	2007-000087	BY230284	R-CHIP;6.8Kohm,5%,1/10W,TP,1608	
R331	2007-000079	BY230280	R-CHIP;1.8Kohm,5%,1/10W,TP,1608	
R333	2007-001039	70795708	R-CHIP;56Kohm,5%,1/8W,TP,2012	
R334	2007-000123	BY230306	R-CHIP;1.5Kohm,5%,1/10W,TP,1608	
R335	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R350	2007-000123	BY230306	R-CHIP;1.5Kohm,5%,1/10W,TP,1608	SD-25VE Only
R360	2007-001196	BY230309	R-CHIP;820Kohm,5%,1/10W,TP,1608	
R371	2007-000119	BY230332	R-CHIP;560ohm,5%,1/10W,TP,1608	
R372	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
R373	2007-000093	BY230308	R-CHIP;20Kohm,5%,1/10W,TP,1608	
R380	2007-000124	BY230295	R-CHIP;2.2Kohm,5%,1/10W,TP,1608	
R3A01	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R3A04	2001-000221	BY230019	R-CARBON;1.2KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R3A05	2007-000616	BY230300	R-CHIP;24Kohm,5%,1/10W,TP,1608	
R3A06	2007-000539	BY230357	R-CHIP;200ohm,5%,1/10W,TP,1608	
R3A07	2007-000133	BY230297	R-CHIP;330Kohm,5%,1/10W,TP,1608	
R3A08	2007-000091	BY230286	R-CHIP;12Kohm,5%,1/10W,TP,1608	
R3A09	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
R3A11	2007-000124	BY230295	R-CHIP;2.2Kohm,5%,1/10W,TP,1608	
R3A12	2007-000074	BY230276	R-CHIP;100ohm,5%,1/10W,TP,1608	
R3A13	2007-000097	BY230290	R-CHIP;47Kohm,5%,1/10W,TP,1608	
R3A14	2007-000094	BY230288	R-CHIP;22Kohm,5%,1/10W,TP,1608	
R3A16	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
R3A17	2007-000124	BY230295	R-CHIP;2.2Kohm,5%,1/10W,TP,1608	
R3A18	2007-000124	BY230295	R-CHIP;2.2Kohm,5%,1/10W,TP,1608	
R3A23	2007-000091	BY230286	R-CHIP;12Kohm,5%,1/10W,TP,1608	
R3A24	2007-000094	BY230288	R-CHIP;22Kohm,5%,1/10W,TP,1608	
R3A25	2001-000221	BY230019	R-CARBON;1.2KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R3A26	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R3A28	2007-000124	BY230295	R-CHIP;2.2Kohm,5%,1/10W,TP,1608	
R3A50	2001-000800	70795044	R-CARBON;5.1KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R3A51	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R3A60	2007-000704	BY230374	R-CHIP;3.6Kohm,5%,1/10W,TP,1608	
R3A70	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
R3S01	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	SD-25VE Only
R3S02	2001-000435	70795008	R-CARBON;1MOHM,5%,1/8W,AA,TP,1.8X3.2MM	SD-25VE Only
R401	2001-000786	70795041	R-CARBON;47KOHM,5%,1/8W,AA,TP,1.8X3.2MM	SD-14VB/SD-25VL Only
R402	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	SD-14VB/SD-25VL Only
R403	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R404	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R406	2007-001010	BY230360	R-CHIP;51Kohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
R408	2007-000122	BY230294	R-CHIP;1.2Kohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
R440	2001-000362	70796067	R-CARBON;150OHM,5%,1/8W,AA,TP,1.8X3.2MM	SD-14VB/SD-25VL Only
R441	2007-000116	BY230349	R-CHIP;120ohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
R4N01	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
R4N02	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R4N03	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R4N04	2001-000563	70795026	R-CARBON;27KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R4N05	2007-000074	BY230276	R-CHIP;100ohm,5%,1/10W,TP,1608	
R4N06	2007-000074	BY230276	R-CHIP;100ohm,5%,1/10W,TP,1608	
R501	2001-000766	70795038	R-CARBON;43KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R502	2007-001056	BY230273	R-CHIP;6.2Kohm,5%,1/10W,TP,1608	
R503	2001-000780	70795039	R-CARBON;470OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R505	2001-000766	70795038	R-CARBON;43KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R506	2007-001056	BY230273	R-CHIP;6.2Kohm,5%,1/10W,TP,1608	
R507	2001-000766	70795038	R-CARBON;43KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R508	2007-001056	BY230273	R-CHIP;6.2Kohm,5%,1/10W,TP,1608	
R509	2007-000087	BY230284	R-CHIP;6.8Kohm,5%,1/10W,TP,1608	
R510	2007-000913	BY230302	R-CHIP;43Kohm,5%,1/10W,TP,1608	
R511	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R512	2001-000660	70795032	R-CARBON;33KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R517	2007-000087	BY230284	R-CHIP;6.8Kohm,5%,1/10W,TP,1608	
R518	2007-000913	BY230302	R-CHIP;43Kohm,5%,1/10W,TP,1608	
R519	2007-001056	BY230273	R-CHIP;6.2Kohm,5%,1/10W,TP,1608	
R520	2001-000766	70795038	R-CARBON;43KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R521	2007-000087	BY230284	R-CHIP;6.8Kohm,5%,1/10W,TP,1608	
R522	2007-001071	70795542	R-CHIP;6.8Kohm,5%,1/8W,TP,2012	
R533	2007-000003	BY230220	R-CHIP;43Kohm,5%,1/8W,TP,2012	
R540	2001-000766	70795038	R-CARBON;43KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R545	2007-000512	BY230373	R-CHIP;2.4Kohm,5%,1/10W,TP,1608	
R546	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
R547	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
R550	2001-000766	70795038	R-CARBON;43KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R551	2007-000093	BY230308	R-CHIP;20Kohm,5%,1/10W,TP,1608	
R552	2007-000913	BY230302	R-CHIP;43Kohm,5%,1/10W,TP,1608	
R553	2007-000093	BY230308	R-CHIP;20Kohm,5%,1/10W,TP,1608	
R570	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
R571	2007-000098	BY230291	R-CHIP;56Kohm,5%,1/10W,TP,1608	
R608	2001-000864	70795047	R-CARBON;56KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R609	2001-000864	70795047	R-CARBON;56KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R610	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R611	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R614	2001-000429	70795005	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R615	2001-000429	70795005	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3.2MM	

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
R617	2001-000864	70795047	R-CARBON;56KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R620	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R622	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R630	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R631	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
R632	2001-000429	70795005	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R633	2001-000429	70795005	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R634	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
R635	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
R636	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R640	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R641	2001-000780	70795039	R-CARBON;470OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R642	2001-000780	70795039	R-CARBON;470OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R644	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
R647	2001-000429	70795005	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R651	2001-000010	70795052	R-CARBON;68KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R657	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
R660	2001-000786	70795041	R-CARBON;47KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R661	2001-000660	70795032	R-CARBON;33KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R666	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
R667	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
R668	2001-000780	70795039	R-CARBON;470OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R669	2001-000780	70795039	R-CARBON;470OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R670	2001-000734	70795040	R-CARBON;4.7KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R671	2001-000734	70795040	R-CARBON;4.7KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R672	2001-000734	70795040	R-CARBON;4.7KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R673	2001-000429	70795005	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R674	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R675	2001-000032	BY230164	R-CARBON;180OHM,5%,1/4W,AA,TP,2.4X6.4MM	
R676	2001-000633	70795029	R-CARBON;30KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R678	2007-000094	BY230288	R-CHIP;22Kohm,5%,1/10W,TP,1608	
R679	2007-000075	BY230277	R-CHIP;220ohm,5%,1/10W,TP,1608	
R682	2007-000094	BY230288	R-CHIP;22Kohm,5%,1/10W,TP,1608	
R685	2001-000812	BY230038	R-CARBON;5.6KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R688	2007-000129	BY230307	R-CHIP;27Kohm,5%,1/10W,TP,1608	
R691	2007-000075	BY230277	R-CHIP;220ohm,5%,1/10W,TP,1608	
R693	2007-000097	BY230290	R-CHIP;47Kohm,5%,1/10W,TP,1608	
R694	2007-000097	BY230290	R-CHIP;47Kohm,5%,1/10W,TP,1608	
R698	2001-000290	70795006	R-CARBON;10KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R6P01	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R6P02	2001-000281	70795004	R-CARBON;100OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R6P03	2007-000081	BY230281	R-CHIP;2.7Kohm,5%,1/10W,TP,1608	
R6P04	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R6P05	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R6P06	2007-000086	BY230283	R-CHIP;5.6Kohm,5%,1/10W,TP,1608	
R6P07	2007-000075	BY230277	R-CHIP;220ohm,5%,1/10W,TP,1608	
R6P08	2001-000005	BY230090	R-CARBON;390ohm,5%,1/8W,AA,TP,1.8x3.2mm	
R6P09	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
R6P10	2001-000515	70795019	R-CARBON;220OHM,5%,1/8W,AA,TP,1.8X3.2MM	
R6P12	2001-000734	70795040	R-CARBON;4.7KOHM,5%,1/8W,AA,TP,1.8X3.2M	
R6P13	2007-000097	BY230290	R-CHIP;47Kohm,5%,1/10W,TP,1608	
R6P14	2007-000123	BY230306	R-CHIP;1.5Kohm,5%,1/10W,TP,1608	
R701	2001-000429	70795005	R-CARBON;1KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R702	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
R703	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
R704	2001-000837	70795045	R-CARBON;51KOHM,5%,1/8W,AA,TP,1.8X3.2MM	
R711	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R712	2007-001167	BY230304	R-CHIP;75ohm,5%,1/10W,TP,1608	
R801A	2007-000116	BY230349	R-CHIP;120ohm,5%,1/10W,TP,1608	
R802	2007-000079	BY230280	R-CHIP;1.8Kohm,5%,1/10W,TP,1608	
R803	2007-000079	BY230280	R-CHIP;1.8Kohm,5%,1/10W,TP,1608	

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
R805	2007-000643	BY230325	R-CHIP;270ohm,5%,1/10W,TP,1608	
R806	2007-000643	BY230325	R-CHIP;270ohm,5%,1/10W,TP,1608	
R807	2007-001134	BY230381	R-CHIP;68ohm,5%,1/10W,TP,1608	
R808	2007-001167	BY230304	R-CHIP;75ohm,5%,1/10W,TP,1608	
R809	2007-001167	BY230304	R-CHIP;75ohm,5%,1/10W,TP,1608	
R810	2007-000643	BY230325	R-CHIP;270ohm,5%,1/10W,TP,1608	
R811	2007-000643	BY230325	R-CHIP;270ohm,5%,1/10W,TP,1608	
R813	2007-000643	BY230325	R-CHIP;270ohm,5%,1/10W,TP,1608	
R814	2007-000643	BY230325	R-CHIP;270ohm,5%,1/10W,TP,1608	
R815	2007-000643	BY230325	R-CHIP;270ohm,5%,1/10W,TP,1608	
R816	2007-000643	BY230325	R-CHIP;270ohm,5%,1/10W,TP,1608	
R819	2007-000643	BY230325	R-CHIP;270ohm,5%,1/10W,TP,1608	
R820	2007-000643	BY230325	R-CHIP;270ohm,5%,1/10W,TP,1608	
R821	2007-000134	BY230298	R-CHIP;33Kohm,5%,1/10W,TP,1608	
R822	2007-000094	BY230288	R-CHIP;22Kohm,5%,1/10W,TP,1608	
R822B	2007-001167	BY230304	R-CHIP;75ohm,5%,1/10W,TP,1608	
R825	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
R827	2007-000101	BY230378	R-CHIP;82Kohm,5%,1/10W,TP,1608	
R828	2007-000101	BY230378	R-CHIP;82Kohm,5%,1/10W,TP,1608	
R829	2007-000101	BY230378	R-CHIP;82Kohm,5%,1/10W,TP,1608	
R830	2007-000101	BY230378	R-CHIP;82Kohm,5%,1/10W,TP,1608	
R835	2007-000101	BY230378	R-CHIP;82Kohm,5%,1/10W,TP,1608	
R836	2007-000101	BY230378	R-CHIP;82Kohm,5%,1/10W,TP,1608	
R839	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
R841	2007-000119	BY230332	R-CHIP;560ohm,5%,1/10W,TP,1608	
R842	2007-000119	BY230332	R-CHIP;560ohm,5%,1/10W,TP,1608	
R843	2007-000119	BY230332	R-CHIP;560ohm,5%,1/10W,TP,1608	
R844	2007-001167	BY230304	R-CHIP;75ohm,5%,1/10W,TP,1608	
R851	2007-000097	BY230290	R-CHIP;47Kohm,5%,1/10W,TP,1608	
R852	2007-000097	BY230290	R-CHIP;47Kohm,5%,1/10W,TP,1608	
R890A	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
R891A	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
R891B	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
R892A	2007-001179	BY230305	R-CHIP;8.2Kohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
R892B	2007-001179	BY230305	R-CHIP;8.2Kohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
R893A	2007-000122	BY230294	R-CHIP;1.2Kohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
R893B	2007-000122	BY230294	R-CHIP;1.2Kohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
R894A	2007-000129	BY230307	R-CHIP;27Kohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
R894B	2007-000129	BY230307	R-CHIP;27Kohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
RM701	AC32-00006A	BY630162	MODULE REMOCON;TSOP2238WE1,38KHZ,-,5.08m	
S602	0603-001134	BY631212	PHOTO TR;-,30V,4V,50mA,75mW,TRAY	
SCS11A	0505-001729	BY530077	FET-SILICON;SPA04N60C3,N,600V,4.5A,0.85O	
SW601	AC34-00005A	BY634845	SWITCH MODE;-,-,-,-,-,-,-,-,-,-,-,-,-,	
SW602	AC34-00006A	BY634846	SWITCH-REC;-,-,-,-,-,-,-,-,-,-,-,-,-,-	
SW701	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW702	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW703	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW704	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW705	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW707	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW708	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW710	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW711	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW712	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW713	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW714	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
SW715	3404-001182	BY632011	SWITCH-TACT;DC12V,50MA,100GF,6.0X6.0X5.0	
TM401	AC40-00032A	BY630378	TM BLOCK;TCMI0610PD20A,PAL I,21-69CH,PL	SD-14VB Only
	AC40-00031A	BY630409	TM BLOCK;TCPL0601PD20A,PAL B/G + SECAM,	SD-25VE Only
	AC40-00029A	BY633021	TM BLOCK;TCMK0601PD20A,PAL B/G + I + D/	SD-25VL Only
W311	2701-000002	BY330009	INDUCTOR-AXIAL;100UH,10%,4298	SD-25VE Only

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
W668	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	SD-14VB/SD-25VL Only
XT301	2801-001397	BY633009	CRYSTAL-UNIT;4.433619MHz,20ppm,28-AAA,S,	
XT4N01	2801-004096	BY631285	CRYSTAL-UNIT;18.432MHZ,20PPM,28-AAA,16PF	
XT602	2801-003139	BY633010	CRYSTAL-UNIT;8MHz,50ppm,28-AAA,22pF,80oh	
ZD1P02	0403-001211	BY430015	DIODE-ZENER;MTZJ12B,11.8-12.3V,500MW,DO-	
ZD1P03	0403-000720	BY430013	DIODE-ZENER;MTZJ9.1B,8.57-9.01V,500MW,DO	
ZD1P04	0403-000717	BY430005	DIODE-ZENER;MTZJ5.1B,4.94-5.2V,500MW,DO-	
ZD1P05	0403-001211	BY430015	DIODE-ZENER;MTZJ12B,11.8-12.3V,500MW,DO-	
ZD1P06	0403-000717	BY430005	DIODE-ZENER;MTZJ5.1B,4.94-5.2V,500MW,DO-	
ZD1SS1	0403-000713	BY430110	DIODE-ZENER;MTZJ20B,18.63-17.7V,500MW,DO	
ZD1SS2	0403-001318	BY430107	DIODE-ZENER;MTZJ4.3B,4.17-4.43V,500MW,DO	
ZD401	0403-000390	70795272	DIODE-ZENER;UZP33B,31.4-34.6V,1000MW,DO-	
ZD701	0403-000720	BY430013	DIODE-ZENER;MTZJ9.1B,8.57-9.01V,500MW,DO	
ZD801	0403-000297	BY430024	DIODE-ZENER;MTZ6.2B,5.96-6.27V,500MW,DO-	
ZD805	0403-001211	BY430015	DIODE-ZENER;MTZJ12B,11.8-12.3V,500MW,DO-	
ZD806	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
ZD807	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
ZD809	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
ZD810	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
ZD811	0403-000720	BY430013	DIODE-ZENER;MTZJ9.1B,8.57-9.01V,500MW,DO	
ZD851	0403-000720	BY430013	DIODE-ZENER;MTZJ9.1B,8.57-9.01V,500MW,DO	
ZD852	0403-000720	BY430013	DIODE-ZENER;MTZJ9.1B,8.57-9.01V,500MW,DO	
ZD853	0403-000720	BY430013	DIODE-ZENER;MTZJ9.1B,8.57-9.01V,500MW,DO	
ZD854	0403-000720	BY430013	DIODE-ZENER;MTZJ9.1B,8.57-9.01V,500MW,DO	
ZD863	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
ZD864	0403-000720	BY430013	DIODE-ZENER;MTZJ9.1B,8.57-9.01V,500MW,DO	
P002	**AK92-00550A**	**BY630430**	**ASSY PCB-DVD;SD-25VE/TSB,DVD MAIN PCB AS**	
AC14	2203-001607	BY130451	C-CER,CHIP;0.22nF,5%,50V,NP0,-,1608	
AC15	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
AC18	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
AC19	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
AC20	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
AC21	2203-000315	BY130441	C-CER,CHIP;0.12NF,5%,50V,C0G,TP,1608	
AC22	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
AC25	2203-000315	BY130441	C-CER,CHIP;0.12NF,5%,50V,C0G,TP,1608	
AC26	2203-000125	BY130520	C-CER,CHIP;1.2nF,10%,50V,X7R,TP,1608,-	
AC27	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
AC4	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
AC5	2203-000125	BY130520	C-CER,CHIP;1.2nF,10%,50V,X7R,TP,1608,-	
AC9	2203-001607	BY130451	C-CER,CHIP;0.22nF,5%,50V,NP0,-,1608	
ACC1	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
ACC2	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
AD1	0407-000114	BY430113	DIODE-ARRAY;DAN202K,80V,100mA,CA2-3,SOT-	
AD2	0407-000114	BY430113	DIODE-ARRAY;DAN202K,80V,100mA,CA2-3,SOT-	
AD40	0407-000116	BY430115	DIODE-ARRAY;DAP202K,80V,100mA,CK2-3,SOT-	
AE10	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
AE11	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
AE13	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
AE14	2401-003107	BY130282	C-AL;47uF,20%,16V,GP,TP,5x7,5	
AE3	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
AE4	2401-003107	BY130282	C-AL;47uF,20%,16V,GP,TP,5x7,5	
AE5	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
AE8	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
AE9	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
AEE1	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
AEE2	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
AEE50	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
AEE51	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	
AIC2	1002-001294	BY631221	IC-D/A CONVERTER;PCM1742KE,24BIT,TSSOP,1	
AIC4	1201-000163	BY631232	IC-OP AMP;4560,SOP,8P,173MIL,DUAL,100V/m	

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
AIC5	1201-000163	BY631232	IC-OP AMP;4560,SOP,8P,173MIL,DUAL,100V/m	
AL1	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
AL2	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
AL3	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
AL4	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
AQ1	0504-000128	BY530074	TR-DIGITAL;-,NPN,200MW,22K/22K,SOT-23,TP	
AQ2	0504-000156	BY530075	TR-DIGITAL;KSR2103,PNP,200MW,22K/22K,SOT	
AQ20	0504-000128	BY530074	TR-DIGITAL;-,NPN,200MW,22K/22K,SOT-23,TP	
AQ21	0504-000156	BY530075	TR-DIGITAL;KSR2103,PNP,200MW,22K/22K,SOT	
AQ3	0501-000341	BY530073	TR-SMALL SIGNAL;KSC1623-L,NPN,200mW,SOT-	
AQ4	0504-000128	BY530074	TR-DIGITAL;-,NPN,200MW,22K/22K,SOT-23,TP	
AQ40	0501-000341	BY530073	TR-SMALL SIGNAL;KSC1623-L,NPN,200mW,SOT-	
AQ41	0501-000341	BY530073	TR-SMALL SIGNAL;KSC1623-L,NPN,200mW,SOT-	
AQ5	0504-000156	BY530075	TR-DIGITAL;KSR2103,PNP,200MW,22K/22K,SOT	
AQ6	0501-000341	BY530073	TR-SMALL SIGNAL;KSC1623-L,NPN,200mW,SOT-	
AR1	2007-000102	BY230292	R-CHIP;100Kohm,5%,1/10W,TP,1608	
AR14	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
AR15	2007-000075	BY230277	R-CHIP;220ohm,5%,1/10W,TP,1608	
AR16	2007-000075	BY230277	R-CHIP;220ohm,5%,1/10W,TP,1608	
AR17	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
AR18	2007-000075	BY230277	R-CHIP;220ohm,5%,1/10W,TP,1608	
AR28	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
AR29	2007-000075	BY230277	R-CHIP;220ohm,5%,1/10W,TP,1608	
AR3	2007-000102	BY230292	R-CHIP;100Kohm,5%,1/10W,TP,1608	
AR30	2007-000075	BY230277	R-CHIP;220ohm,5%,1/10W,TP,1608	
AR31	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
AR32	2007-000075	BY230277	R-CHIP;220ohm,5%,1/10W,TP,1608	
AR35	2007-000074	BY230276	R-CHIP;100ohm,5%,1/10W,TP,1608	
AR40	2007-000074	BY230276	R-CHIP;100ohm,5%,1/10W,TP,1608	
AR41	2007-001179	BY230305	R-CHIP;8.2Kohm,5%,1/10W,TP,1608	
AR42	2007-000082	BY230233	R-CHIP;3.3Kohm,5%,1/10W,TP,1608	
AR43	2007-000092	BY230287	R-CHIP;15Kohm,5%,1/10W,TP,1608	
AR46	2007-001179	BY230305	R-CHIP;8.2Kohm,5%,1/10W,TP,1608	
AR47	2007-000082	BY230233	R-CHIP;3.3Kohm,5%,1/10W,TP,1608	
AR48	2007-000092	BY230287	R-CHIP;15Kohm,5%,1/10W,TP,1608	
AR49	2007-000102	BY230292	R-CHIP;100Kohm,5%,1/10W,TP,1608	
AR50	2007-000102	BY230292	R-CHIP;100Kohm,5%,1/10W,TP,1608	
ARR1	2007-000939	BY230380	R-CHIP;47Kohm,1%,1/10W,TP,1608	
ARR2	2007-000939	BY230380	R-CHIP;47Kohm,1%,1/10W,TP,1608	
ARR3	2007-000939	BY230380	R-CHIP;47Kohm,1%,1/10W,TP,1608	
ARR4	2007-000939	BY230380	R-CHIP;47Kohm,1%,1/10W,TP,1608	
ARR40	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
ARR41	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
ARR5	2007-000102	BY230292	R-CHIP;100Kohm,5%,1/10W,TP,1608	
ARR50	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
ARR51	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
ARR6	2007-000102	BY230292	R-CHIP;100Kohm,5%,1/10W,TP,1608	
AZ1	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
AZ2	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
AZ3	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
AZ4	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
BD01	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
BD02	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
C10	2203-000681	BY130445	C-CER,CHIP;0.027NF,5%,50V,C0G,TP,1608	
C7	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C8	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
C9	2203-000681	BY130445	C-CER,CHIP;0.027NF,5%,50V,C0G,TP,1608	
CC1	2203-000440	BY130462	C-CER,CHIP;1nF,10%,50V,X7R,TP,1608,-	
CC10	2203-005065	BY130479	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,-,1608	
CC12	2203-005065	BY130479	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,-,1608	
CC13	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
CC14	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CC15	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CC17	2203-001103	BY130447	C-CER,CHIP;6.8nF,10%,50V,X7R,TP,1608,-	
CC2	2203-000440	BY130462	C-CER,CHIP;1nF,10%,50V,X7R,TP,1608,-	
CC20	2203-005065	BY130479	C-CER,CHIP;1000nF,+80-20%,10V,Y5V,-,1608	
CC21	2203-000975	BY130484	C-CER,CHIP;47nF,10%,25V,X7R,TP,1608,-	
CC22	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CC23	2203-001052	BY130464	C-CER,CHIP;0.56nF,10%,50V,X7R,TP,1608	
CC24	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CC25	2203-000998	BY130446	C-CER,CHIP;0.047NF,5%,50V,C0G,TP,1608	
CC26	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CC27	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CC28	2203-005221	BY130467	C-CER,CHIP;15nF,10%,50V,X7R,TP,1608,-	
CC3	2203-000440	BY130462	C-CER,CHIP;1nF,10%,50V,X7R,TP,1608,-	
CC30	2203-001052	BY130464	C-CER,CHIP;0.56nF,10%,50V,X7R,TP,1608	
CC31	2203-005221	BY130467	C-CER,CHIP;15nF,10%,50V,X7R,TP,1608,-	
CC32	2203-005221	BY130467	C-CER,CHIP;15nF,10%,50V,X7R,TP,1608,-	
CC33	2203-001052	BY130464	C-CER,CHIP;0.56nF,10%,50V,X7R,TP,1608	
CC34	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CC35	2203-000815	BY130476	C-CER,CHIP;0.033NF,5%,50V,C0G,TP,1608	
CC36	2203-000815	BY130476	C-CER,CHIP;0.033NF,5%,50V,C0G,TP,1608	
CC37	2203-000815	BY130476	C-CER,CHIP;0.033NF,5%,50V,C0G,TP,1608	
CC4	2203-000440	BY130462	C-CER,CHIP;1nF,10%,50V,X7R,TP,1608,-	
CC5	2203-000189	BY130540	C-CER,CHIP;100nF,+80-20%,25V,Y5V,TP,1608	
CC8	2401-001250	70796211	C-AL;4.7uF,20%,35V,GP,TP,4x5,5	
CCC01	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC02	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC03	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC04	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC05	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC06	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC07	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC08	2401-001479	BY130015	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,5	
CCC09	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC10	2401-001479	BY130015	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,5	
CCC13	2401-002144	BY130049	C-AL;47uF,20%,16V,GP,TP,5x11,5	
CCC15	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC16	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC17	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC18	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC19	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC20	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC21	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC22	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CCC23	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
CN41	3710-002050	BY634861	CONNECTOR-SOCKET;12P,1R,2mm,STRAIGHT,SN,	
CN42	3710-002050	BY634861	CONNECTOR-SOCKET;12P,1R,2mm,STRAIGHT,SN,	
CNL1	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
CNL2	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
DABD1	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
DAC4	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
DAL2	2901-001273	BY330077	FILTER-EMI SMD;50V,2A,-,220pF,3.2x1.6x0.	
DAR1	2007-000402	BY230314	R-CHIP;150ohm,5%,1/10W,TP,1608	
DAR2	2007-000402	BY230314	R-CHIP;150ohm,5%,1/10W,TP,1608	
DAZ1	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
DAZ2	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
DCON1	3708-001266	BY634807	CONNECTOR-FPC/FFC/PIC;11P,1MM,STRAIGHT,S	
DCON3	3708-001696	BY634793	CONNECTOR-FPC/FFC/PIC;24P,1MM,STRAIGHT,S	
DIC2	1107-001369	BY631279	IC-FLASH MEMORY;29LV800,1Mx8/512Kx16,TSO	
DIC3	1103-001204	BY631258	IC-EEPROM;24C021,256x8,SOP,8P,5.13x3.95m	
DIC4	0801-002701	BY631253	IC-CMOS LOGIC;74VHCT125A,BUFFER,TSSOP,14	

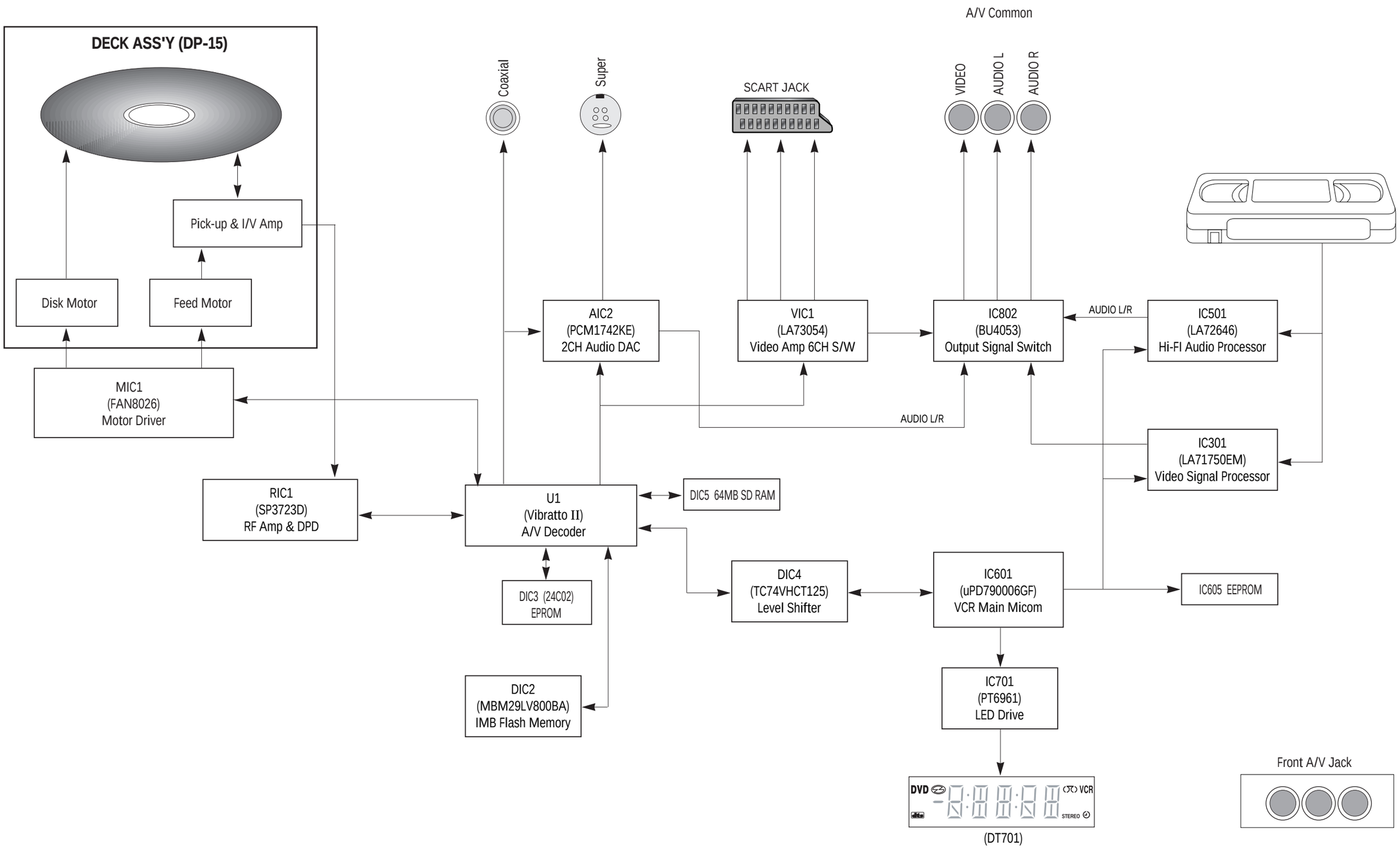
Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
DIC5	1105-001513	BY631288	IC-DRAM;IS42S16400A-7T,1Mx16Bitx4Bit,T	
DJP10	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
DJP11	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
DJP2	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
DRIC1	1003-001735	BY631261	IC-MOTOR DRIVER;FAN8026G3,SSOPH,28P,18.4	
DY1	2801-004279	BY330092	CRYSTAL-UNIT;27.00MHz,10ppm,28-AAA,20pF,	
ECC1	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
ECC2	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
FB2	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
JACK1	3722-002128	BY634865	JACK-PIN;3P,SN/NI,RED/WHT/BLK,ANGLE	
JL1	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
JL2	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
LDD1	0407-000116	BY430115	DIODE-ARRAY;DAP202K,80V,100mA,CK2-3,SOT-	
LDQ1	0501-000341	BY530073	TR-SMALL SIGNAL;KSC1623-L,NPN,200mW,SOT-	
LDQ2	0501-000341	BY530073	TR-SMALL SIGNAL;KSC1623-L,NPN,200mW,SOT-	
LDQ3	0501-000341	BY530073	TR-SMALL SIGNAL;KSC1623-L,NPN,200mW,SOT-	
LDR1	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
LDR2	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
LDR3	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
LDR4	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
LDR5	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
LDR6	2007-000075	BY230277	R-CHIP;220ohm,5%,1/10W,TP,1608	
LPC4	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
LPE1	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
LPE2	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
LPR1	2007-000312	BY230321	R-CHIP;10ohm,5%,1/4W,TP,3216	
LPR2	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
LPR3	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
LPR4	2007-000312	BY230321	R-CHIP;10ohm,5%,1/4W,TP,3216	
MC1	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
MC10	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
MC3	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
MC5	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
MCE1	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
MCE10	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
MCE2	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
MCE3	2401-003107	BY130282	C-AL;47uF,20%,16V,GP,TP,5x7,5	
MD1	0407-000114	BY430113	DIODE-ARRAY;DAN202K,80V,100mA,CA2-3,SOT-	
opr10	2007-000123	BY230306	R-CHIP;1.5Kohm,5%,1/10W,TP,1608	
PAC10	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
PAE11	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
PHL11	2007-000033	70693337	R-CHIP;0ohm,5%,1/4W,TP,3216	
PL2	2703-000398	BY330078	INDUCTOR-SMD;10uH,10%,3225	
PPBD1	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
PPC1	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
PPC2	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
PPC3	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
PPC80	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
PPC82	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
PPE1	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
PPE18	2401-001479	BY130015	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,5	
PPE2	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
PPE25	2401-002144	BY130049	C-AL;47uF,20%,16V,GP,TP,5x11,5	
PPE3	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
PPE4	2401-003107	BY130282	C-AL;47uF,20%,16V,GP,TP,5x7,5	
PPIC2	1203-003132	BY631289	IC-POSI.ADJUST REG.;AMC1117,SOT-223,3P,6	
PPIC3	1203-003216	BY631290	IC-POSI.FIXED REG.;G9133,TO-220F,4P,10.1	
PPR2	2007-000343	BY230379	R-CHIP;120ohm,1%,1/10W,TP,1608	
PPR3	2007-000074	BY230276	R-CHIP;100ohm,5%,1/10W,TP,1608	
QLP1	0501-000279	BY530079	TR-SMALL SIGNAL;KSA1182-Y,PNP,150mW,SOT-	

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
QLP2	0501-000279	BY530079	TR-SMALL SIGNAL;KSA1182-Y,PNP,150mW,SOT-	
R10	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
R13	2007-000118	BY230293	R-CHIP;390ohm,5%,1/10W,TP,1608	
R36	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
R38	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
R39	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
R40	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
R41	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
R42	2007-000102	BY230292	R-CHIP;100Kohm,5%,1/10W,TP,1608	
R46	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
R47	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
R7	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
R73	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
R8	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
R9	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
RAR11	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
RC1	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
RC12	2203-001126	BY130478	C-CER,CHIP;0.68nF,10%,50V,X7R,TP,1608	
RC19	2203-000315	BY130441	C-CER,CHIP;0.12NF,5%,50V,C0G,TP,1608	
RC20	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	
RC21	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	
RC23	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	
RC24	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
RC25	2203-000491	BY130443	C-CER,CHIP;2.2nF,10%,50V,X7R,TP,1608,-	
RC28	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
RC29	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
RC30	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
RC31	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
RC32	2203-001034	BY130541	C-CER,CHIP;5.6nF,10%,50V,X7R,TP,1608,-	
RC33	2203-001034	BY130541	C-CER,CHIP;5.6nF,10%,50V,X7R,TP,1608,-	
RC34	2203-000440	BY130462	C-CER,CHIP;1nF,10%,50V,X7R,TP,1608,-	
RC35	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
RC36	2203-001034	BY130541	C-CER,CHIP;5.6nF,10%,50V,X7R,TP,1608,-	
RC37	2203-001034	BY130541	C-CER,CHIP;5.6nF,10%,50V,X7R,TP,1608,-	
RC6	2203-001103	BY130447	C-CER,CHIP;6.8nF,10%,50V,X7R,TP,1608,-	
RC7	2203-001634	BY130460	C-CER,CHIP;33nF,10%,50V,X7R,TP,1608,1.6m	
RC8	2203-001607	BY130451	C-CER,CHIP;0.22nF,5%,50V,NP0,-,1608	
RC9	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
RCL23	3301-000314	BY330074	BEAD-SMD;120ohm,1.6x0.8x0.8mm,150mA,,,,	
RE10	2401-001479	BY130015	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,5	
RFR20	2007-000119	BY230332	R-CHIP;560ohm,5%,1/10W,TP,1608	
RFR21	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
RFR22	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
RIC1	AK13-00005A	BY631270	IC ASIC;SP3723DE0PM,EXINO2,64,5,+135,Q	
RL1	2007-000033	70693337	R-CHIP;0ohm,5%,1/4W,TP,3216	
RL2	2007-000033	70693337	R-CHIP;0ohm,5%,1/4W,TP,3216	
RN1	2011-000475	BY230366	R-NET;33OHM,5%,1/16W,L,CHIP,8P,TP,32	
RN2	2011-000475	BY230366	R-NET;33OHM,5%,1/16W,L,CHIP,8P,TP,32	
RN3	2011-000475	BY230366	R-NET;33OHM,5%,1/16W,L,CHIP,8P,TP,32	
ROC1	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
RR11	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
RR15	2007-000134	BY230298	R-CHIP;33Kohm,5%,1/10W,TP,1608	
RR16	2007-000122	BY230294	R-CHIP;1.2Kohm,5%,1/10W,TP,1608	
RR17	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
RR18	2007-000965	BY230303	R-CHIP;5.1Kohm,5%,1/10W,TP,1608	
RR19	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
RR20	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
RR21	2007-000087	BY230284	R-CHIP;6.8Kohm,5%,1/10W,TP,1608	
RR22	2007-000087	BY230284	R-CHIP;6.8Kohm,5%,1/10W,TP,1608	
RR24	2007-000087	BY230284	R-CHIP;6.8Kohm,5%,1/10W,TP,1608	
RR25	2007-000087	BY230284	R-CHIP;6.8Kohm,5%,1/10W,TP,1608	

Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
RR26	2007-000087	BY230284	R-CHIP;6.8Kohm,5%,1/10W,TP,1608	
RR27	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
RR28	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
RR29	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
RR3	2007-000082	BY230233	R-CHIP;3.3Kohm,5%,1/10W,TP,1608	
RR32	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
RR36	2007-001694	BY230382	R-CHIP;12Kohm,0.5%,1/10W,TP,1608	
RR37	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
RR39	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
RR4	2007-000082	BY230233	R-CHIP;3.3Kohm,5%,1/10W,TP,1608	
RR44	2007-000113	BY230328	R-CHIP;33ohm,5%,1/10W,TP,1608	
RR5	2007-000082	BY230233	R-CHIP;3.3Kohm,5%,1/10W,TP,1608	
RR50	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
RR51	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
RR6	2007-000082	BY230233	R-CHIP;3.3Kohm,5%,1/10W,TP,1608	
RR7	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
RR8	2007-000100	70795719	R-CHIP;68Kohm,5%,1/10W,TP,1608	
RR9	2007-000093	BY230308	R-CHIP;20Kohm,5%,1/10W,TP,1608	
SDC3	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
SDC4	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
SDC43	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
SDC49	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
SDC5	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
SDC6	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
SDC7	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
SDC8	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
SJACK	3722-001375	BY634838	JACK-DIN;4P,-,NI,BLK,-	
SR1	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
SR10	2007-000134	BY230298	R-CHIP;33Kohm,5%,1/10W,TP,1608	
SR11	2007-000094	BY230288	R-CHIP;22Kohm,5%,1/10W,TP,1608	
SR12	2007-000129	BY230307	R-CHIP;27Kohm,5%,1/10W,TP,1608	
SR13	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
SR14	2007-001694	BY230382	R-CHIP;12Kohm,0.5%,1/10W,TP,1608	
SR15	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
SR16	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
SR2	2007-000094	BY230288	R-CHIP;22Kohm,5%,1/10W,TP,1608	
SR3	2007-001694	BY230382	R-CHIP;12Kohm,0.5%,1/10W,TP,1608	
SR4	2007-000090	BY230285	R-CHIP;10Kohm,5%,1/10W,TP,1608	
SR5	2007-001694	BY230382	R-CHIP;12Kohm,0.5%,1/10W,TP,1608	
SR6	2007-001694	BY230382	R-CHIP;12Kohm,0.5%,1/10W,TP,1608	
SR7	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
SR8	2007-000134	BY230298	R-CHIP;33Kohm,5%,1/10W,TP,1608	
SR9	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
U1	1204-002260	BY631292	IC-PAL/NTSC DECODER;ES6629FD,PQFP,208P,2	
VAR32	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
VAR33	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
VAR34	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
VBD1	3301-001461	BY330090	BEAD-SMD;300ohm,1.6x0.8x0.8mm,300mA,TP,	
VBD2	3301-001461	BY330090	BEAD-SMD;300ohm,1.6x0.8x0.8mm,300mA,TP,	
VC10	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
VC11	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
VC17	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
VC30	2203-001607	BY130451	C-CER,CHIP;0.22nF,5%,50V,NP0,-,1608	
VC44	2203-001607	BY130451	C-CER,CHIP;0.22nF,5%,50V,NP0,-,1608	
VC50	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
VC6	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
VC7	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
VC8	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
VC9	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
VE1	2401-002165	BY130280	C-AL;100uF,20%,16V,GP,TP,6.3x7,5	
VE2	2401-000922	BY130044	C-AL;22uF,20%,16V,GP,TP,5x5,5	

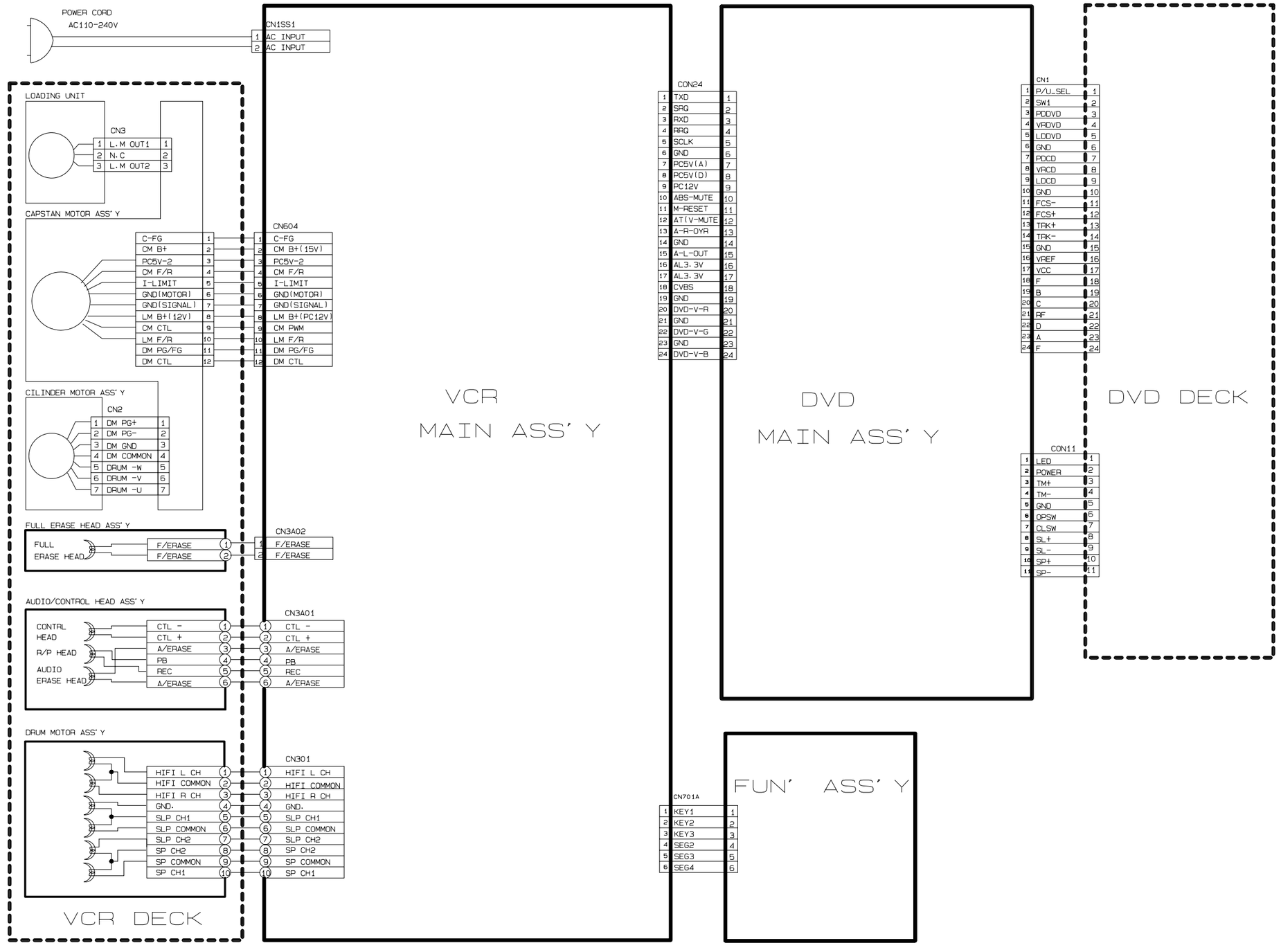
Loc. No	Reference No.	TSB Parts No.	Description ; Specification	Remark
VE4	2401-001479	BY130015	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,5	
VE5	2401-001479	BY130015	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,5	
VE6	2401-001479	BY130015	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,5	
VE7	2401-001479	BY130015	C-AL;470uF,20%,10V,GP,TP,6.3*11mm,5	
VIC1	1204-001978	BY631245	IC-VIDEO PROCESS;LA73054,-,36P,-,SSOP,7V	
VL1	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
VL2	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
VL3	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
VL4	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
VL5	3301-001419	BY330073	BEAD-SMD;-,220,-,500,TP,-,0.3	
VL6	2703-000398	BY330078	INDUCTOR-SMD;10uH,10%,3225	
VR10	2007-001164	BY230333	R-CHIP;75ohm,1%,1/10W,TP,1608	
VR11	2007-001164	BY230333	R-CHIP;75ohm,1%,1/10W,TP,1608	
VR17	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
VR19	2007-000084	BY230282	R-CHIP;4.7Kohm,5%,1/10W,TP,1608	
VR2	2007-001164	BY230333	R-CHIP;75ohm,1%,1/10W,TP,1608	
VR20	2007-001167	BY230304	R-CHIP;75ohm,5%,1/10W,TP,1608	
VR21	2007-001167	BY230304	R-CHIP;75ohm,5%,1/10W,TP,1608	
VR3	2007-001164	BY230333	R-CHIP;75ohm,1%,1/10W,TP,1608	
VR32	2007-001167	BY230304	R-CHIP;75ohm,5%,1/10W,TP,1608	
VR33	2007-001167	BY230304	R-CHIP;75ohm,5%,1/10W,TP,1608	
VR34	2007-001167	BY230304	R-CHIP;75ohm,5%,1/10W,TP,1608	
VR4	2007-001164	BY230333	R-CHIP;75ohm,1%,1/10W,TP,1608	
VR5	2007-001164	BY230333	R-CHIP;75ohm,1%,1/10W,TP,1608	
VR6	2007-001164	BY230333	R-CHIP;75ohm,1%,1/10W,TP,1608	
VR7	2007-001164	BY230333	R-CHIP;75ohm,1%,1/10W,TP,1608	
VR8	2007-001164	BY230333	R-CHIP;75ohm,1%,1/10W,TP,1608	
VR9	2007-001164	BY230333	R-CHIP;75ohm,1%,1/10W,TP,1608	
VRC18	2007-000070	BY230274	R-CHIP;0ohm,5%,1/10W,TP,1608	
VSC1	2203-000257	BY130440	C-CER,CHIP;10nF,10%,50V,X7R,TP,1608	
VZ20	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
VZ21	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
VZ22	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
VZ23	0403-001083	BY430111	DIODE-ZENER;UDZ9.1B,8.85-9.23V,200MW,UMD	
ZC47	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
ZC49	2203-005148	BY130480	C-CER,CHIP;100nF,10%,16V,X7R,TP,1608	
ZR49	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	
ZR50	2007-000078	BY230279	R-CHIP;1Kohm,5%,1/10W,TP,1608	

12. Block Diagram



MEMO

13. Wiring Diagram



MEMO

14. Schematic Diagrams

14-1 S.M.P.S. ---------- 14-2

14-2 Power Drive ---------- 14-3

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14-3 System Control/Servo ---------- 14-5

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14-9 OSD/VPS/PDC ---------- 14-10

14-10 TM ---------- 14-11

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14-13 DVD Servo ---------- 14-14

14-14 DVD Audio/Video ---------- 14-15

Note

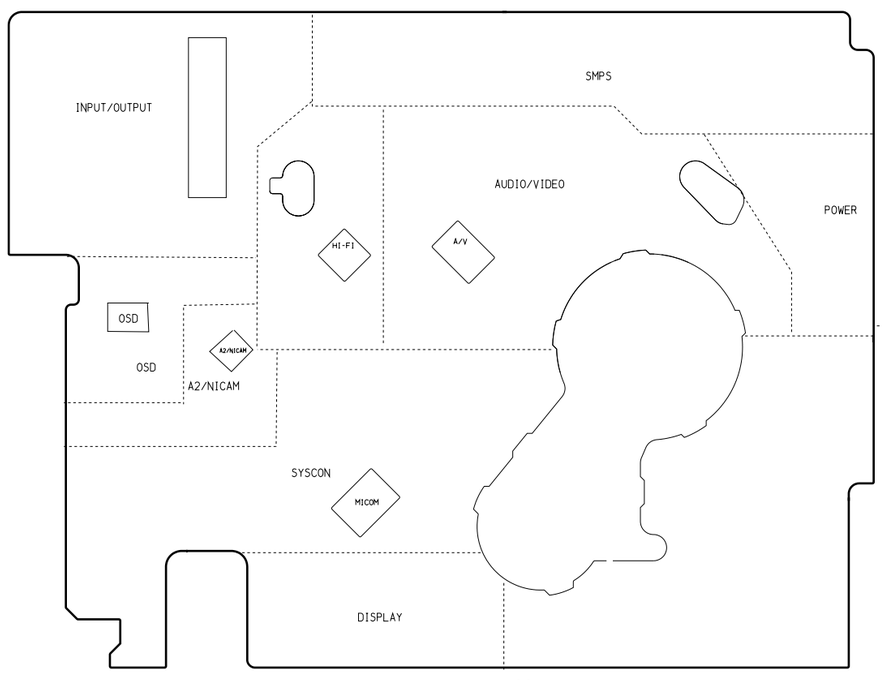
For schematic Diagram
- Resistors are in ohms, 1/8W unless otherwise noted.

Special note :
Most semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described under the "electrostatically sensitive (ES) devices" section of this service manual.

Note :
Do not use the part number shown on this drawing for ordering. The correct part number is shown in the parts list (may be slightly different or amended since this drawing was prepared).

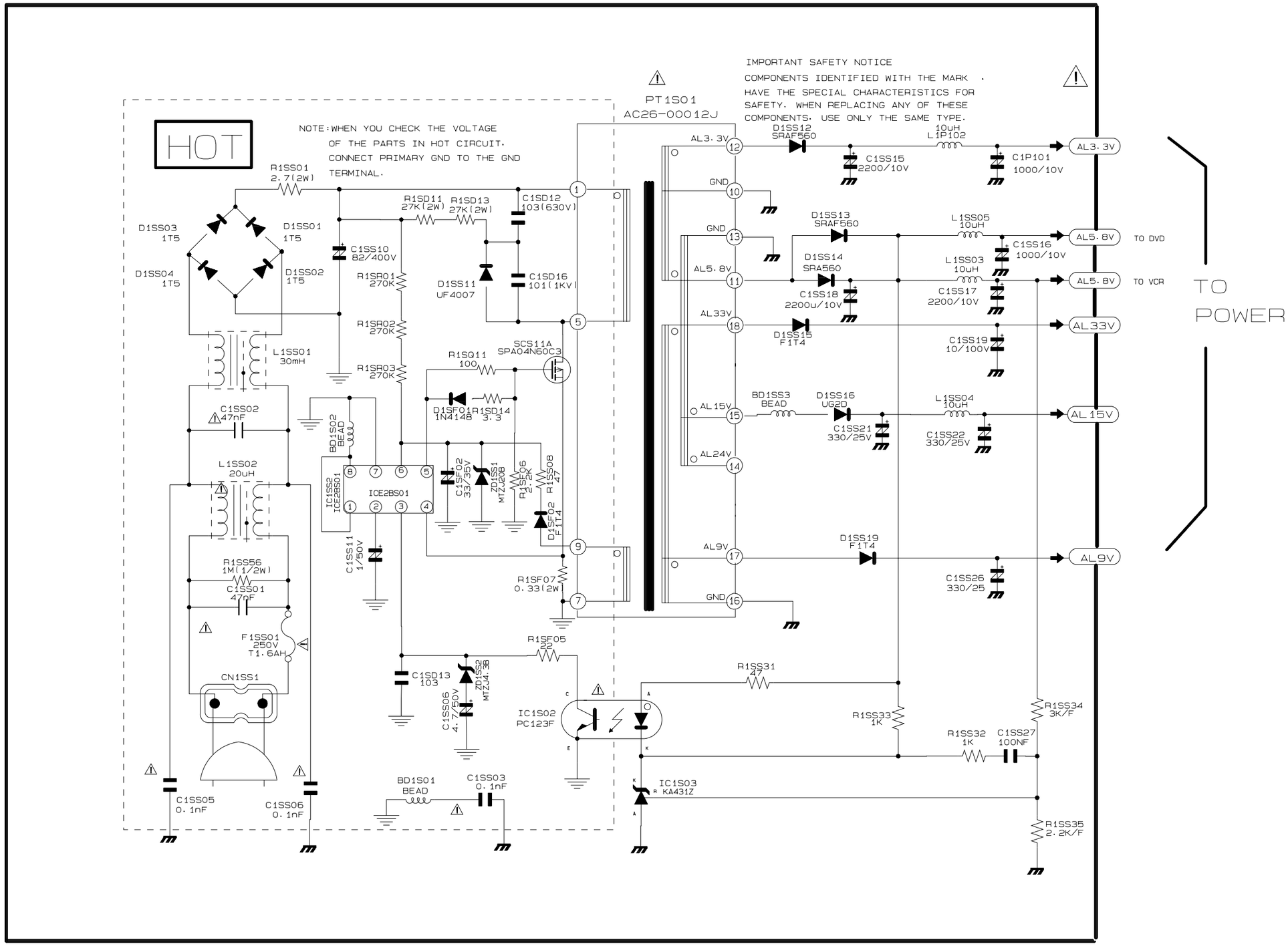
Important safety notices :
Components identified with the mark ⚠ have the special characteristics for safety. When replacing any of these components.
Use only the same type.

◆ Block Identification of Main PCB

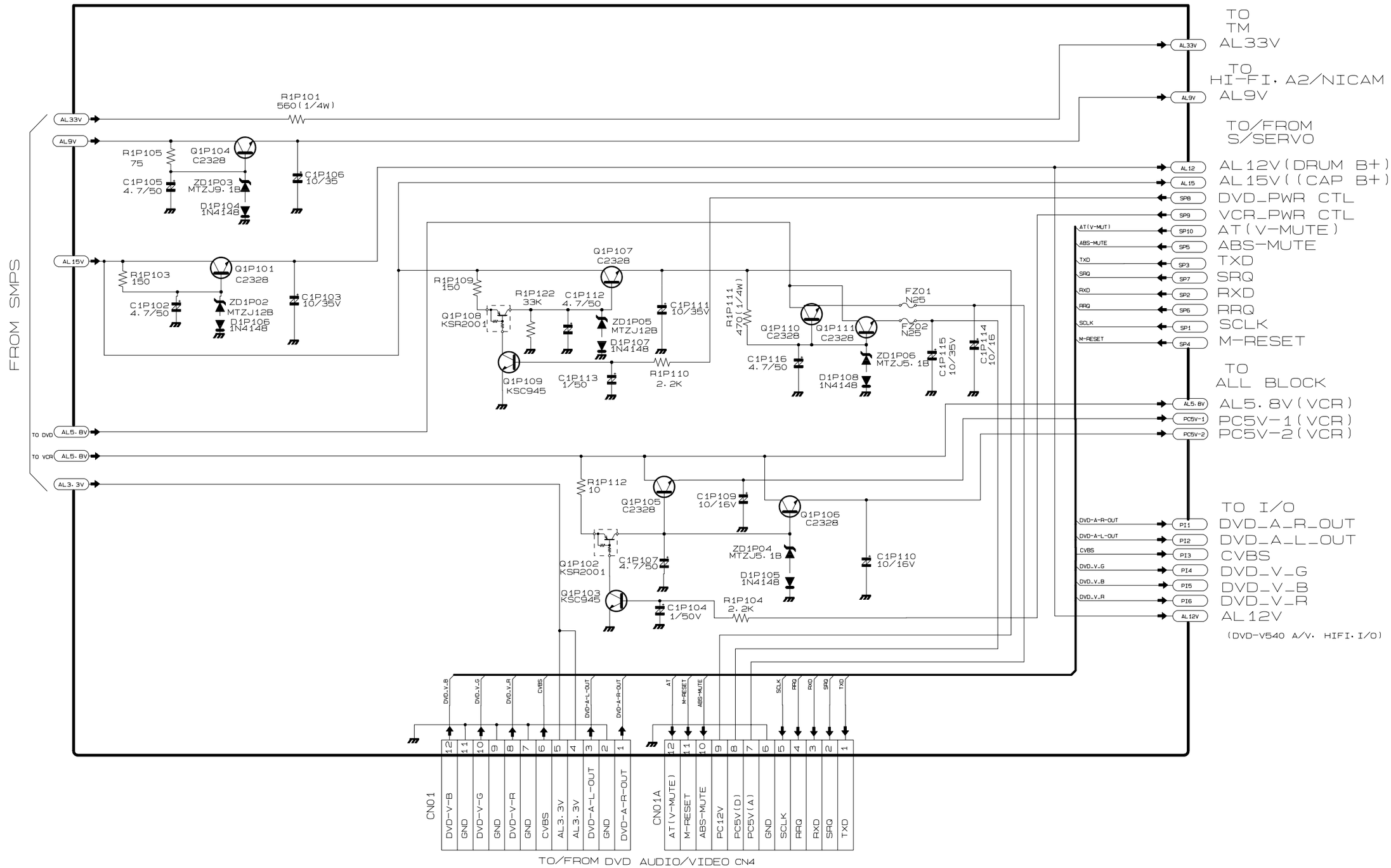


<Component Side>

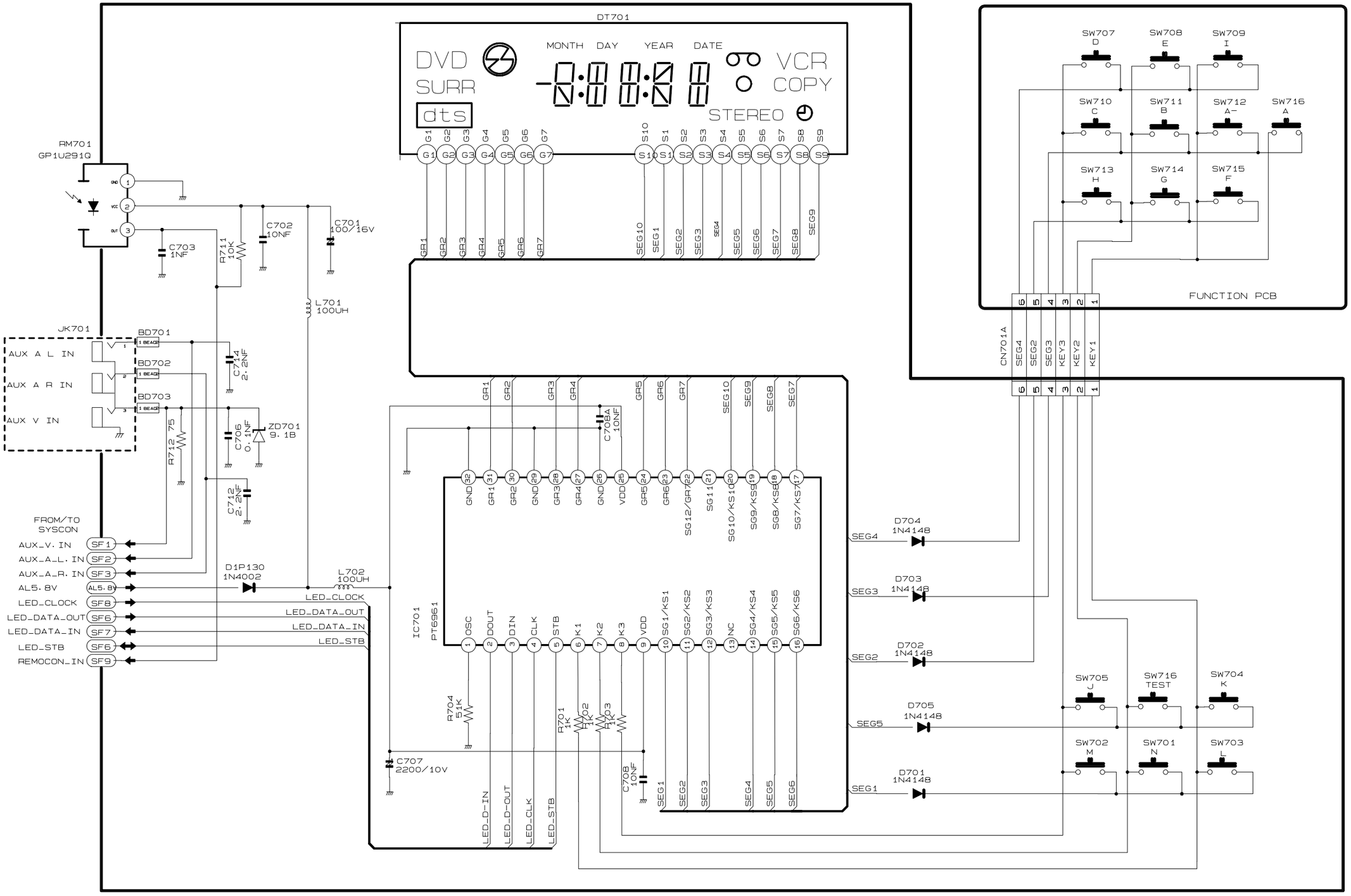
14-1 S.M.P.S.


HOT
NOTE:WHEN YOU CHECK THE VOLTAGE OF THE PARTS IN HOT CIRCUIT. CONNECT PRIMARY GND TO THE GND TERMINAL.
IMPORTANT SAFETY NOTICE
COMPONENTS IDENTIFIED WITH THE MARK . HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS. USE ONLY THE SAME TYPE.
PT1S01
AC26-00012J
R1SS01 2.7(2W)
D1SS03 1T5
D1SS01 1T5
D1SS04 1T5
D1SS02 1T5
C1SS10 82/400V
R1SR01 270K
R1SR02 270K
R1SR03 270K
R1SD11 27K(2W)
R1SD13 27K(2W)
C1SD12 103(630V)
D1SS11 UF4007
C1SD16 101(1KV)
L1SS01 30mH
SCS11A SPA04N60C3
R1SQ11 100
D1SF01 1N4148
R1SD14 3.3
C1SS02 47nF
BD1S02 BEAD
L1SS02 20uH
IC1SS2 ICE2BS01
ICE2BS01
C15F02 33/35V
ZD1SS1 MTZJ20B
R1SS06 2.2K
R1SS08 47
D1SF02 F1T4
C1SS11 1/50V
R1SS56 1M(1/2W)
C1SS01 47nF
F1SS01 250V T1.6AH
CN1SS1
C1SS05 0.1nF
C1SS06 0.1nF
BD1S01 BEAD
C1SS03 0.1nF
R1SF07 0.33(2W)
R1SF05 22
C1SD13 103
ZD1SS2 MTZJ4.3B
C1SS06 4.7/50V
IC1S02 PC123F
R1SS31 47
R1SS33 1K
R1SS32 1K
C1SS27 100NF
R1SS34 3K/F
IC1S03 KA431Z
R1SS35 2.2K/F
AL3.3V
GND
AL5.8V
AL33V
AL15V
AL24V
AL9V
D1SS12 SRAF560
C1SS15 2200/10V
10uH L1P102
C1P101 1000/10V
D1SS13 SRAF560
L1SS05 10uH
C1SS16 1000/10V
TO DVD
D1SS14 SRA560
L1SS03 10uH
C1SS17 2200/10V
TO VCR
C1SS18 2200u/10V
D1SS15 F1T4
C1SS19 10/100V
BD1SS3 BEAD
D1SS16 UG2D
C1SS21 330/25V
L1SS04 10uH
C1SS22 330/25V
D1SS19 F1T4
C1SS26 330/25
TO POWER

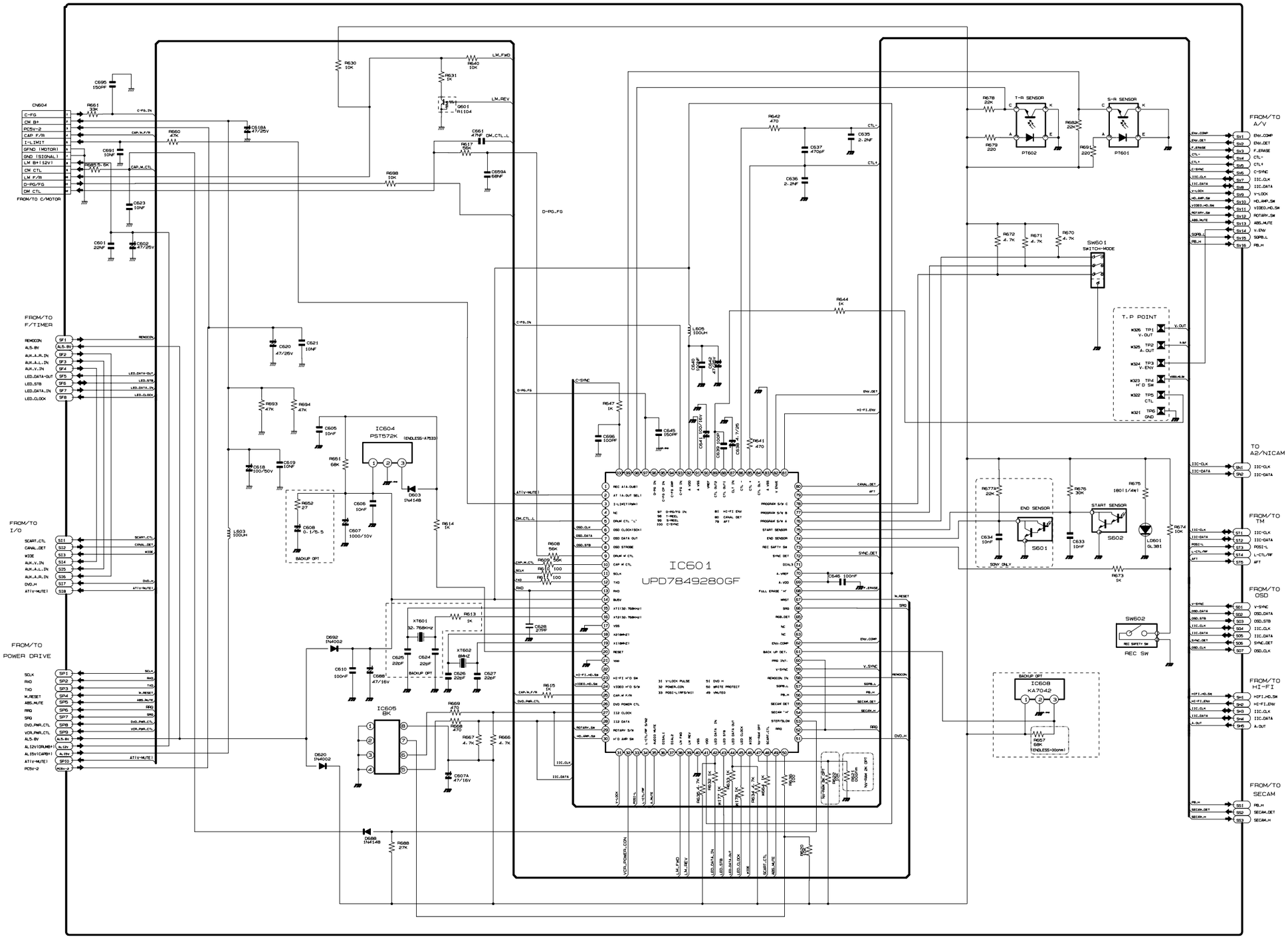
14-2 Power Drive



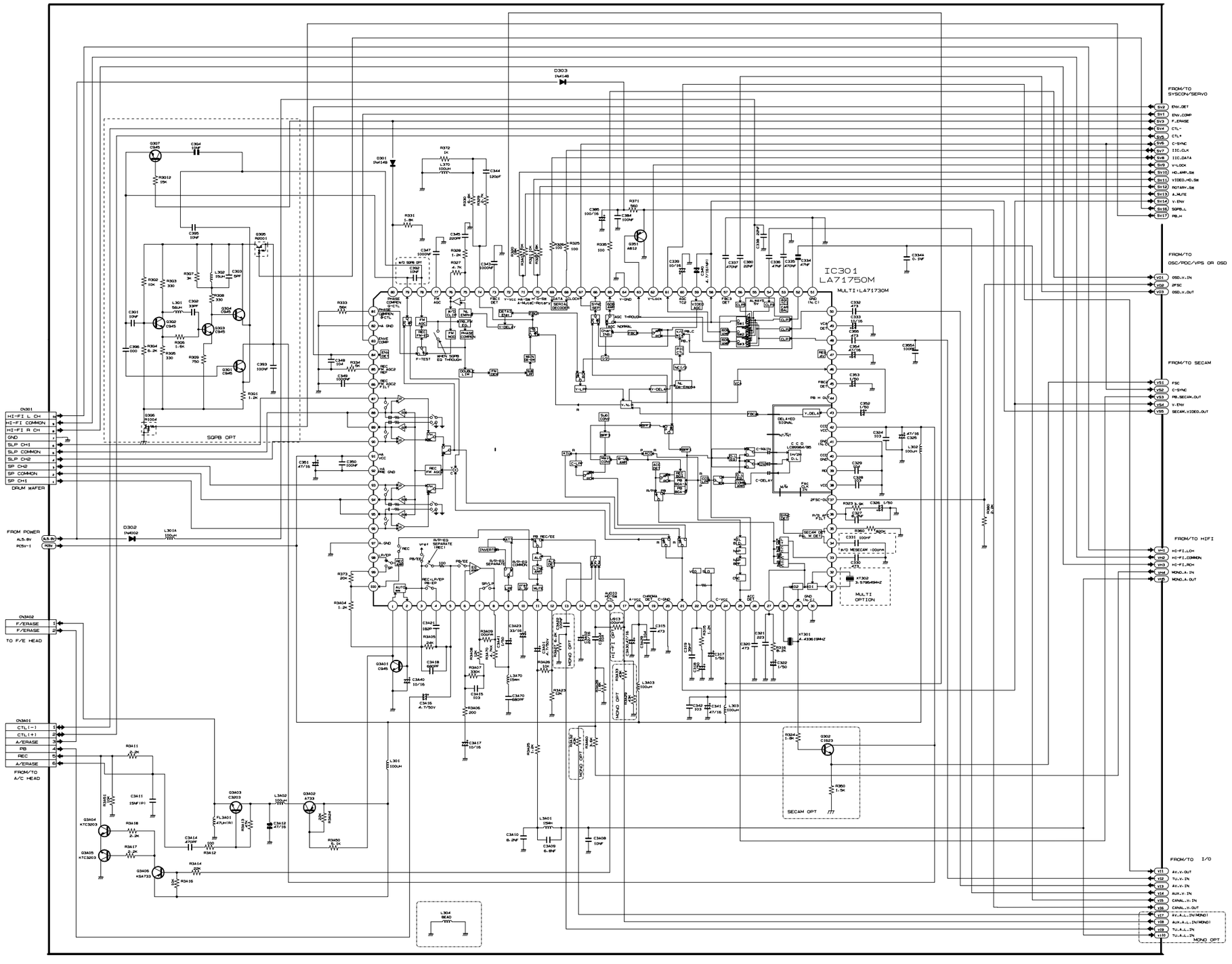
14-3 Display/Function



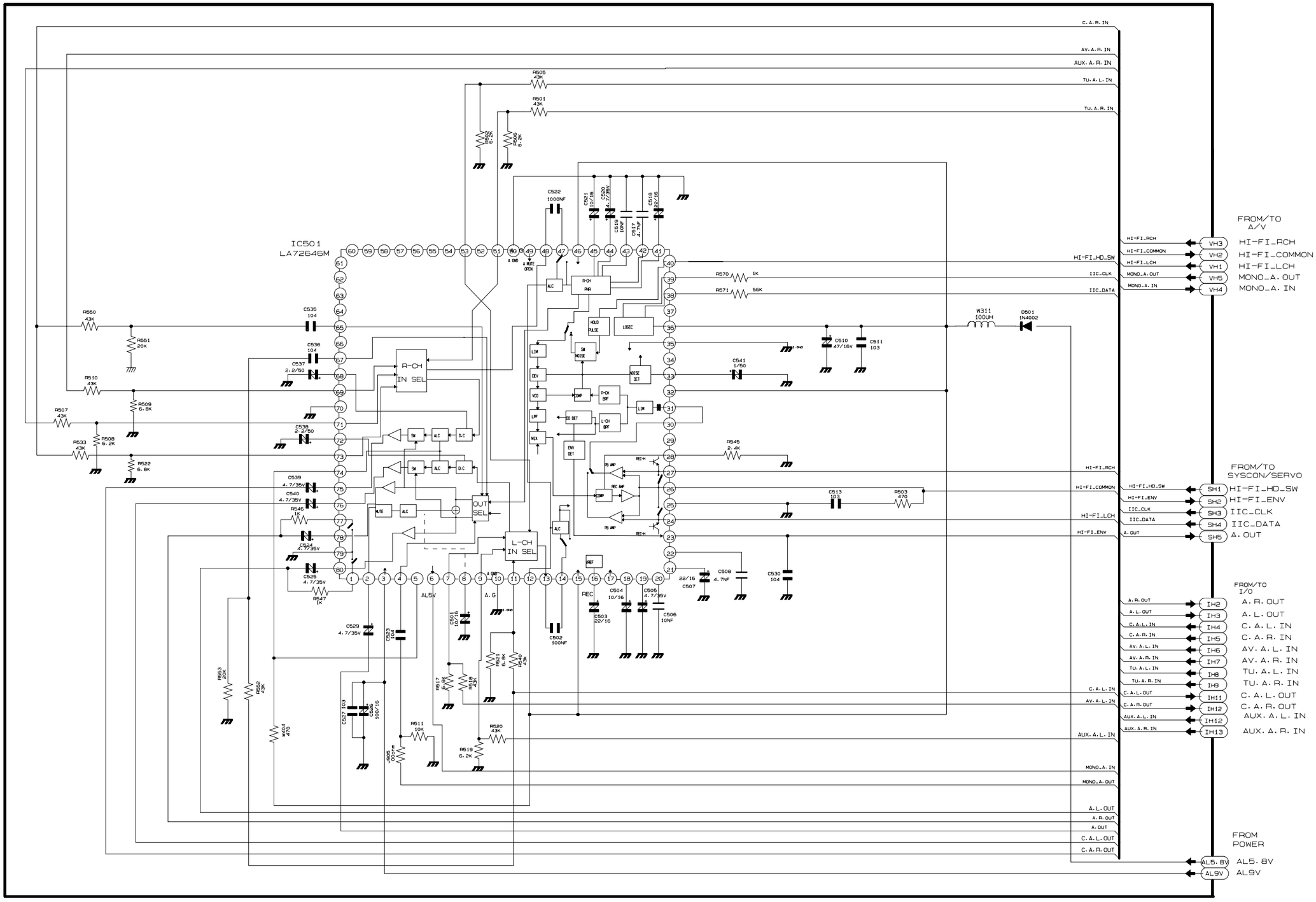
14-4 System Control/Servo


IC601
UPD784928OGF
IC604
PST572K
IC605
8K
IC608
KA7042
SW601
SWITCH-MODE
SW602
REC SW
S601
S602
T-R SENSOR
S-R SENSOR
PT602
PT601
END SENSOR
START SENSOR
LD601
T.P POINT
BACKUP OPT
SONY ONLY
FROM/TO A/V
FROM/TO TM
FROM/TO OSD
FROM/TO HI-FI
FROM/TO SECAM
TO A2/NICAM
FROM/TO F/TIMER
FROM/TO I/O
FROM/TO POWER DRIVE
FROM/TO C/MOTOR
CN604
C-FG
CM_B+
PCSV-2
CAP_F/R
I-LIMIT
GND (MOTOR)
GND (SIGNAL)
LM_B+(12V)
CM_CTL
LM_F/R
D-PG/FG
DM_CTL
D-PG_FG
C-SYNC
C-FG_IN
ENV_DET
HI-FI_ENV
CANAL_DET
AFT
SYNC_DET
V_SYNC
REMOCON
SDRB_L
PB_H
SECAM_DET
SECAM_H
RRQ
SRQ
N_RESET
ENV_COMP
V-LOCK
HD_AMP_SW
VIDEO_HD_SW
ROTARY_SW
ABS_MUTE
V_ENV
SQRB_L
PB_H
IIC_CLK
IIC_DATA
OSD_CLK
OSD_STB
OSD_DATA
POSI-L
L-CTL_RF
AFT
SYNC_DET
SECAM_DET
SECAM_H
A_OUT
ATIV-MUTE
LM_FWD
LM_REV
DM_CTL_L
CAP_M_CTL
CAP_F/R
SCART_CTL
CANAL_DET
WIDE
AUX_V_IN
AUX_A_L_IN
AUX_A_R_IN
DVD_H
ATIV-MUTE
SCLK
RXD
TXD
W_RESET
ABS_MUTE
RRQ
SRQ
DVD_PWR_CTL
VCR_PWR_CTL
AL5.8V
AL12V(CRUNCH)
AL12V(CARBON)
ATIV-MUTE
PCSV-2
REMOCON
AL5.8V
AUX_A_R_IN
AUX_A_L_IN
AUX_V_IN
LED_DATA-OUT
LED_STB
LED_DATA_IN
LED_CLOCK
SCART_CTL
CANAL_DET
WIDE
AUX_V_IN
AUX_A_L_IN
AUX_A_R_IN
DVD_H
ATIV-MUTE
SCLK
RXD
TXD
W_RESET
ABS_MUTE
RRQ
SRQ
DVD_PWR_CTL
VCR_PWR_CTL
AL5.8V
AL12V(CRUNCH)
AL12V(CARBON)
ATIV-MUTE
PCSV-2
ENV_COMP
ENV_DET
F_ERASE
CTL-
CTL+
C-SYNC
IIC_CLK
IIC_DATA
V_LOCK
HD_AMP_SW
VIDEO_HD_SW
ROTARY_SW
ABS_MUTE
V_ENV
SQRB_L
PB_H
IIC-CLK
IIC-DATA
POSI-L
L-CTL_RF
AFT
V-SYNC
OSD_DATA
OSD_STB
IIC_CLK
IIC_DATA
SYNC_DET
OSD_CLK
HIFI_HD_SW
HI-FI_ENV
IIC_CLK
IIC_DATA
A_OUT
PB_H
SECAM_DET
SECAM_H
C695 150PF
R630 10K
R640 10K
R631 1K
VR601 R1104
C661 47NF
R617 56K
C659A 68NF
R698 10K
R651 33K
R650 47K
R699 5.6K
C691 10NF
C623 10NF
C601 22NF
C602 47/25V
C618A 47/25V
C620 47/25V
C621 10NF
R693 47K
R694 47K
C605 10NF
C618 100/50V
C619 10NF
R652 27
C608 0.1/5.5
BACKUP OPT
R651 68K
C606 10NF
C607 1000/10V
D603 1N4148
R614 1K
L603 100UH
R642 470
C637 470PF
C635 2.2NF
C636 2.2NF
R644 1K
L605 100UH
C644 1000/16V
C639 47/25V
C639 100PF
C638 47/25V
R647 1K
C646 150PF
C645 150PF
R641 470
C646 100NF
R645 100
R646 100
R609 56K
C628 27PF
R613 1K
X601 32.768KHz
X602 8MHZ
C625 22PF
C624 22PF
C626 22PF
C627 22PF
C610 100NF
C688 47/16V
D692 1N4002
D620 1N4002
R615 1K
R669 470
R668 470
R667 4.7K
R666 4.7K
C607A 47/16V
D688 1N4148
R688 27K
R678 22K
R679 220
R682 22K
R681 220
R672 4.7K
R671 4.7K
R670 4.7K
R677A 22K
R676 30K
R675 1801/4W
C634 10NF
C633 10NF
R674 10K
R673 1K
R657 68K
ENDLESS-100rmt
R653 4.7K
R654 4.7K
R655 4.7K
R656 4.7K
R657 1K
R658 1K
R659 1K
R660 1K
R661 1K
R662 1K
R663 1K
R664 1K
R665 1K
R666 1K
R667 1K
R668 1K
R669 1K
R670 1K
R671 1K
R672 1K
R673 1K
R674 1K
R675 1K
R676 1K

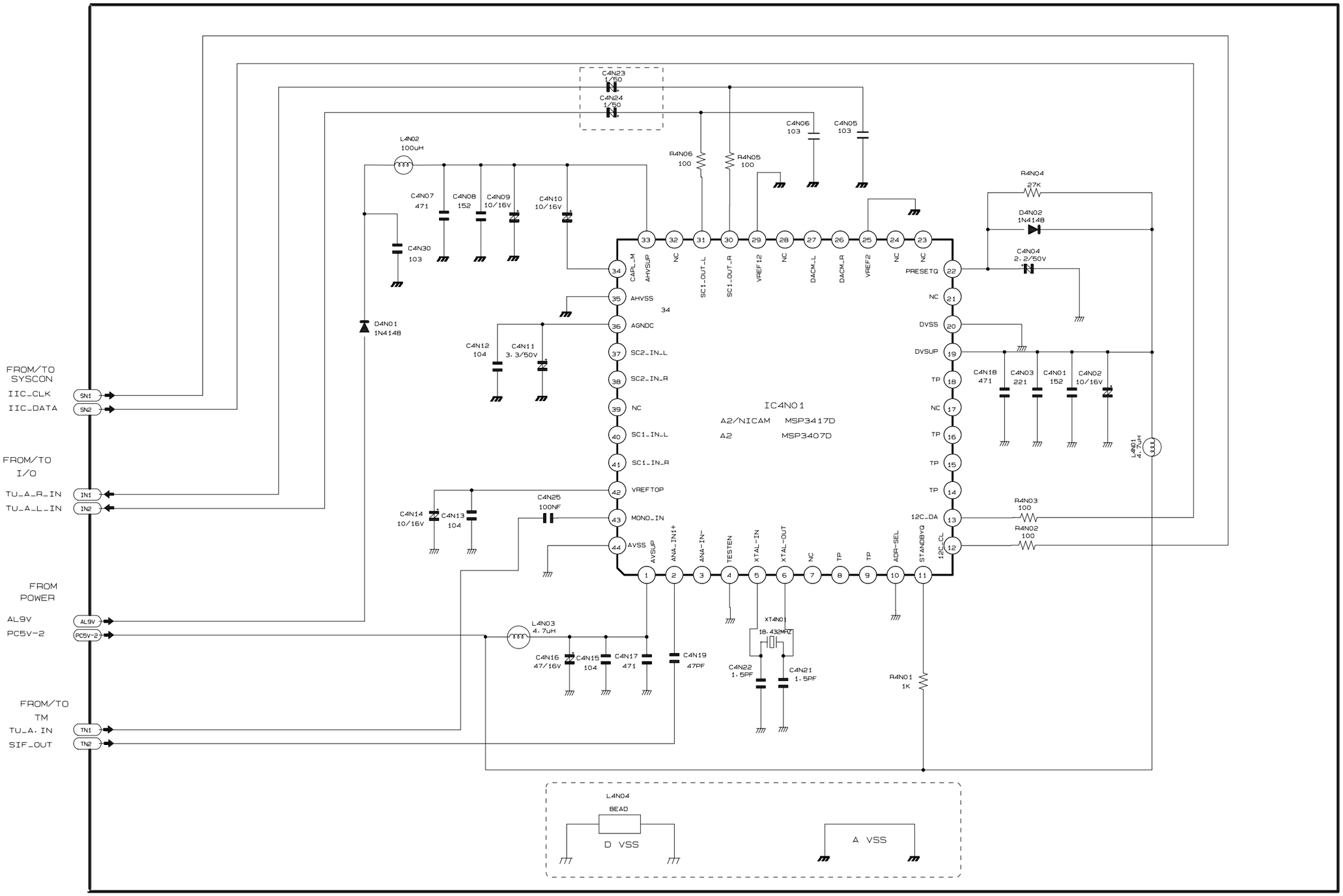
14-5 A/V


IC301
LA71750M
MULTI+LA71730M
FROM/TO SYSCON/SERVO
FROM/TO OSC/PDC/VPS OR OSD
FROM/TO SECAM
FROM/TO HIFI
FROM/TO I/O
CN301
DRUM WAFER
FROM POWER
CN3402
TO F/E HEAD
CN3401
FROM/TO A/C HEAD
SQPB OPT
SECAM OPT
MULTI OPTION
MONO OPT

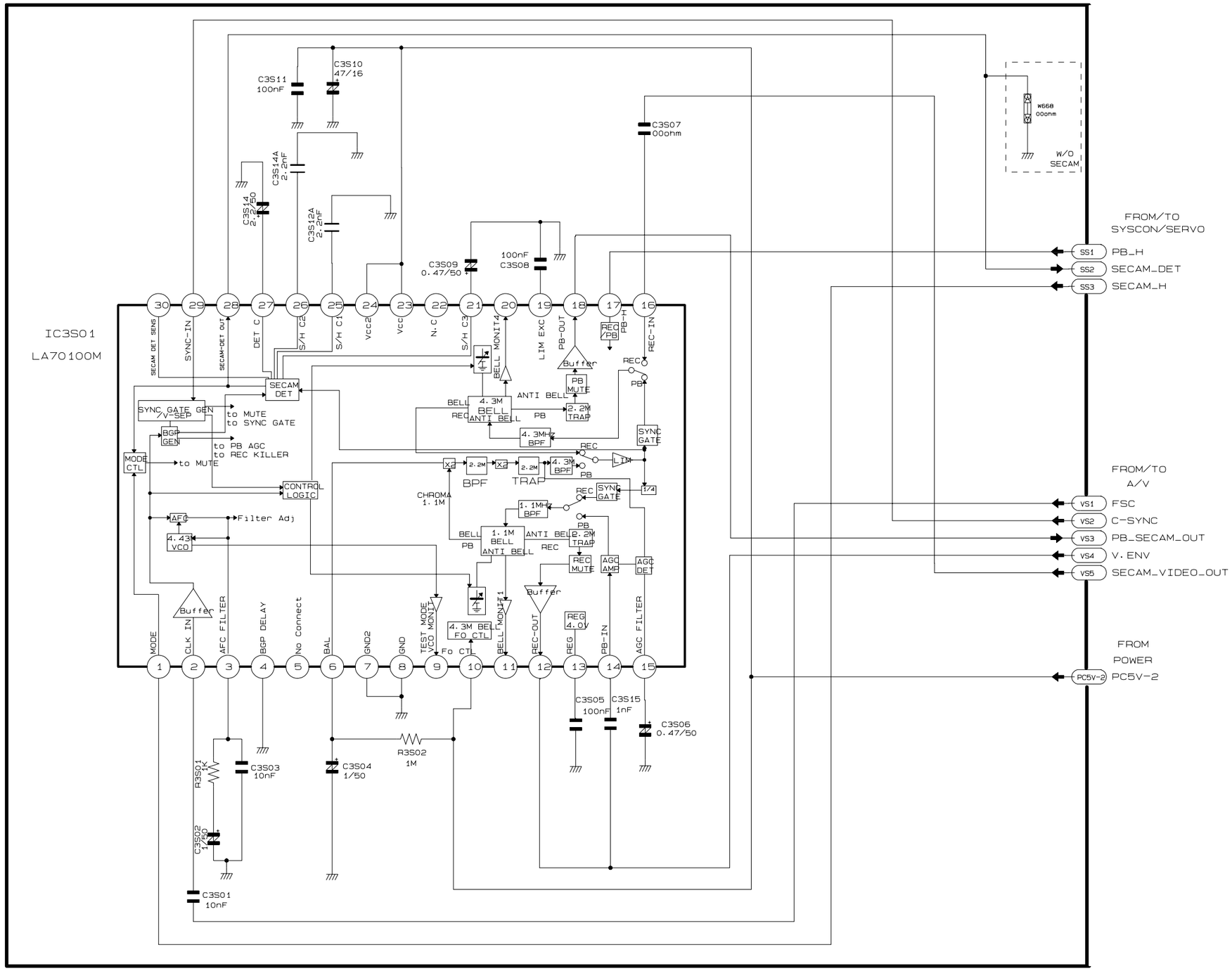
14-6 Hi-Fi


IC501
LA72646M
R-CH IN SEL
L-CH IN SEL
OUT SEL
C.A.R.IN
AV.A.R.IN
AUX.A.R.IN
TU.A.L.IN
TU.A.R.IN
HI-FI_RCH
HI-FI_COMMON
HI-FI_LCH
MONO_A.OUT
MONO_A.IN
HI-FI_HD_SW
IIC_CLK
IIC_DATA
FROM/TO A/V
VH3 HI-FI_RCH
VH2 HI-FI_COMMON
VH1 HI-FI_LCH
VH5 MONO_A.OUT
VH4 MONO_A.IN
FROM/TO SYSCON/SERVO
SH1 HI-FI_HD_SW
SH2 HI-FI_ENV
SH3 IIC_CLK
SH4 IIC_DATA
SH5 A.OUT
FROM/TO I/O
IH2 A.R.OUT
IH3 A.L.OUT
IH4 C.A.L.IN
IH5 C.A.R.IN
IH6 AV.A.L.IN
IH7 AV.A.R.IN
IH8 TU.A.L.IN
IH9 TU.A.R.IN
IH11 C.A.L.OUT
IH12 C.A.R.OUT
IH12 AUX.A.L.IN
IH13 AUX.A.R.IN
FROM POWER
AL5.8V AL5.8V
AL9V AL9V

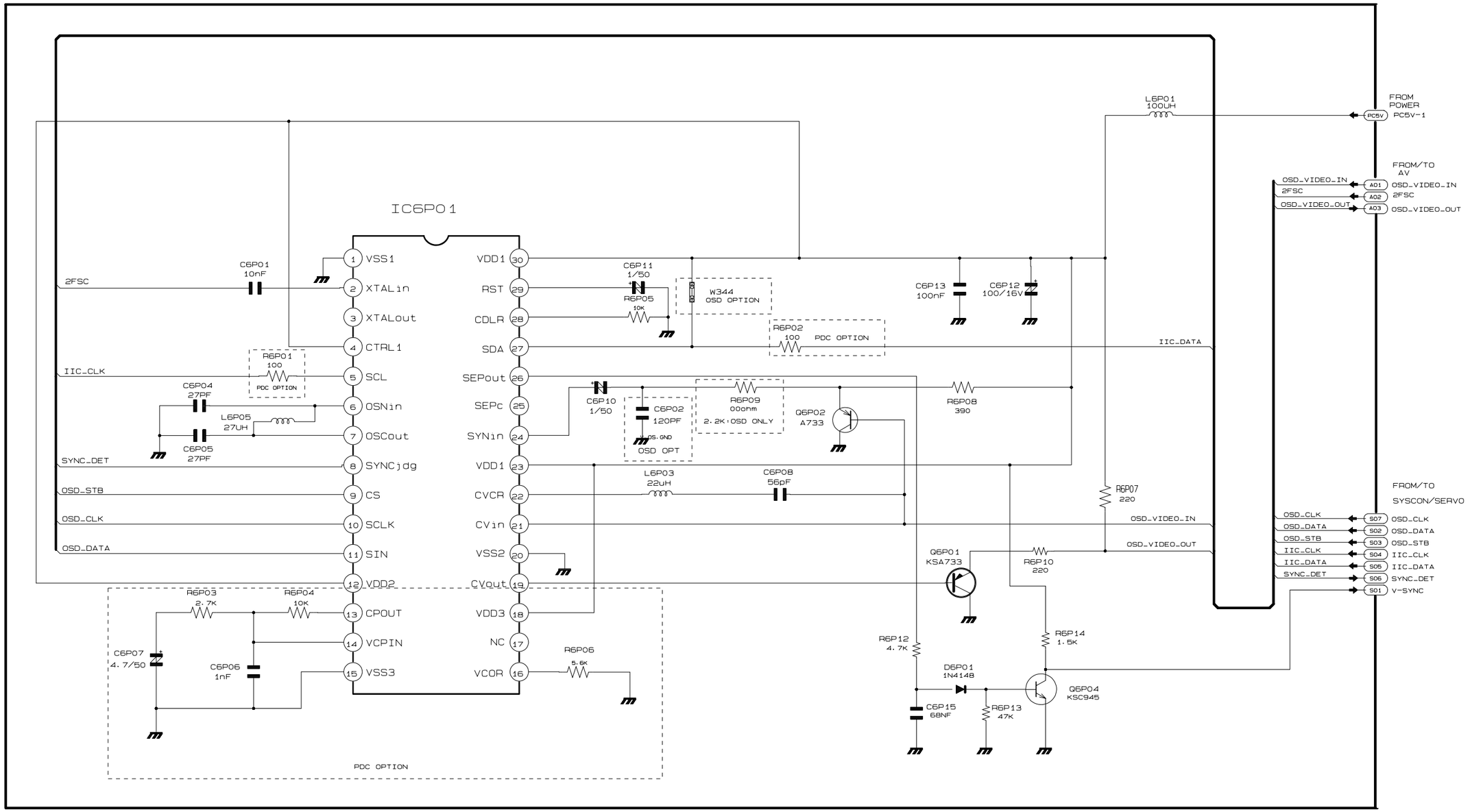
14-7 A2/NICAM


C4N23 1/50
C4N24 1/50
L4N02 100uH
R4N06 100
R4N05 100
C4N06 103
C4N05 103
R4N04 27K
D4N02 1N4148
C4N04 2.2/50V
C4N07 471
C4N08 152
C4N09 10/16V
C4N10 10/16V
C4N30 103
D4N01 1N4148
C4N12 104
C4N11 3.3/50V
IC4N01
A2/NICAM MSP3417D
A2 MSP3407D
C4N18 471
C4N03 221
C4N01 152
C4N02 10/16V
L4N01 4.7uH
C4N25 100NF
C4N14 10/16V
C4N13 104
R4N03 100
R4N02 100
L4N03 4.7uH
C4N16 47/16V
C4N15 104
C4N17 471
C4N19 47PF
XT4N01 18.432MHZ
C4N22 1.5PF
C4N21 1.5PF
R4N01 1K
L4N04 BEAD
D VSS
A VSS
FROM/TO SYSCON
IIC_CLK
IIC_DATA
FROM/TO I/O
TU_A_R_IN
TU_A_L_IN
FROM POWER
AL9V
PC5V-2
FROM/TO TM
TU_A. IN
SIF_OUT
SN1
SN2
IN1
IN2
AL9V
PC5V-2
TN1
TN2
33 CAPL_M
32 AHVSUP
31 NC
30 SC1_OUT_L
29 SC1_OUT_R
28 VREF12
27 NC
26 DACM_L
25 DACM_R
24 VREF2
23 NC
22 PRESETQ
21 NC
20 DVSS
19 DVSUP
18 TP
17 NC
16 TP
15 TP
14 TP
13 I2C_DA
12 I2C_CL
11 STANDBYQ
10 ADR-SEL
9 TP
8 TP
7 NC
6 XTAL-OUT
5 XTAL-IN
4 TESTEN
3 ANA-IN-
2 ANA-IN1+
1 AVSUP
34 AHVSS
35 AGNDC
36 SC2_IN_L
37 SC2_IN_R
38 NC
39 SC1_IN_L
40 SC1_IN_R
41 VREFTOP
42 MONO_IN
43 AVSS
44

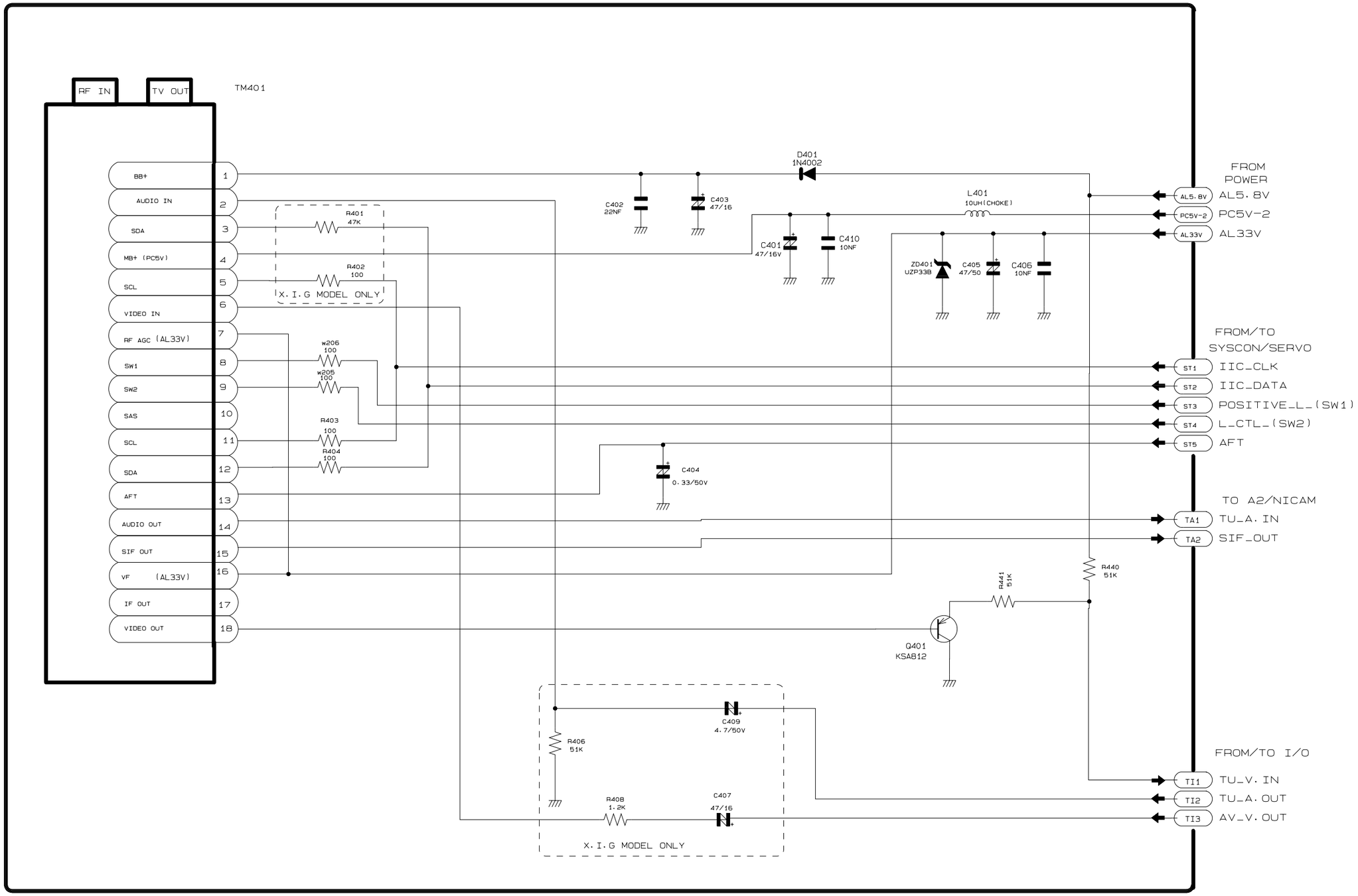
14-8 SECAM (Option)



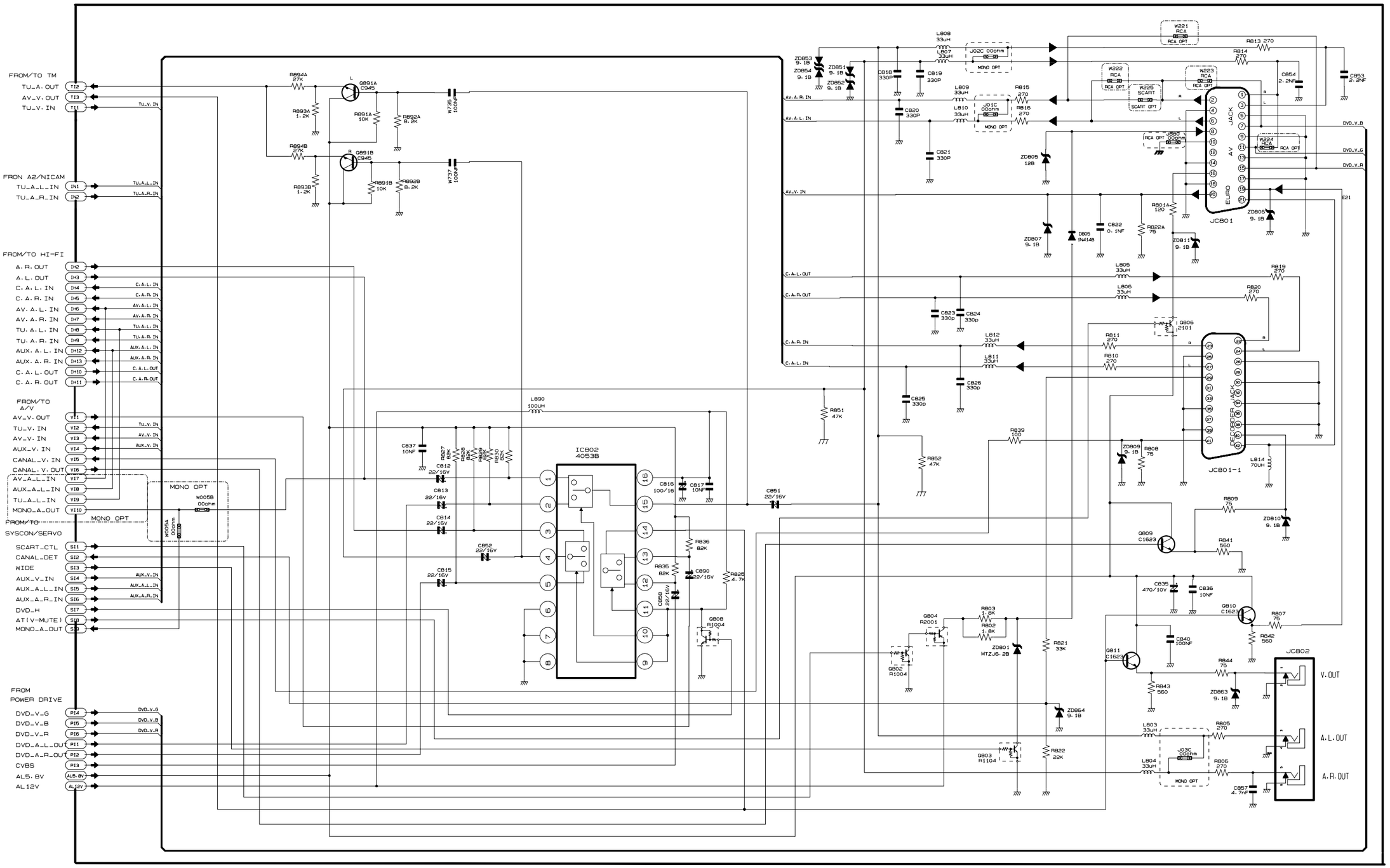
14-9 OSD/VPS/PDC



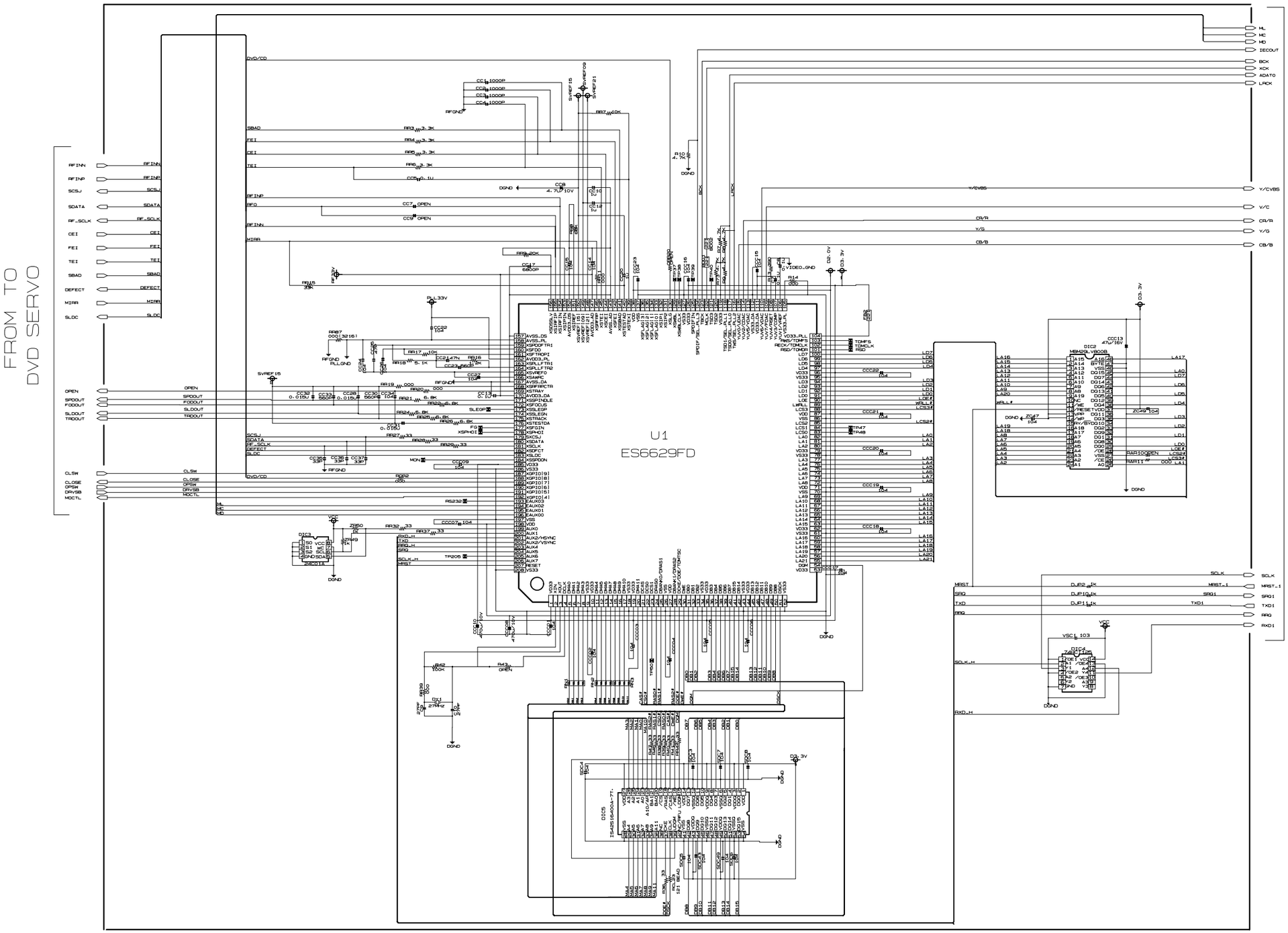
14-10 TM


RF IN
TV OUT
TM401
BB+ 1
AUDIO IN 2
SDA 3
MB+ (PC5V) 4
SCL 5
VIDEO IN 6
RF AGC (AL33V) 7
SW1 8
SW2 9
SAS 10
SCL 11
SDA 12
AFT 13
AUDIO OUT 14
SIF OUT 15
VF (AL33V) 16
IF OUT 17
VIDEO OUT 18
R401 47K
R402 100
X.I.G MODEL ONLY
W206 100
W205 100
R403 100
R404 100
C402 22NF
C403 47/16
D401 1N4002
C401 47/16V
C410 10NF
L401 10UH(CHOKE)
ZD401 UZP33B
C405 47/50
C406 10NF
C404 0.33/50V
R440 51K
R441 51K
Q401 KSA812
C409 4.7/50V
R406 51K
R408 1.2K
C407 47/16
X.I.G MODEL ONLY
FROM POWER
AL5.8V
PC5V-2
AL33V
FROM/TO SYSCON/SERVO
ST1 IIC_CLK
ST2 IIC_DATA
ST3 POSITIVE_L_(SW1)
ST4 L_CTL_(SW2)
ST5 AFT
TO A2/NICAM
TA1 TU_A.IN
TA2 SIF_OUT
FROM/TO I/O
TI1 TU_V.IN
TI2 TU_A.OUT
TI3 AV_V.OUT

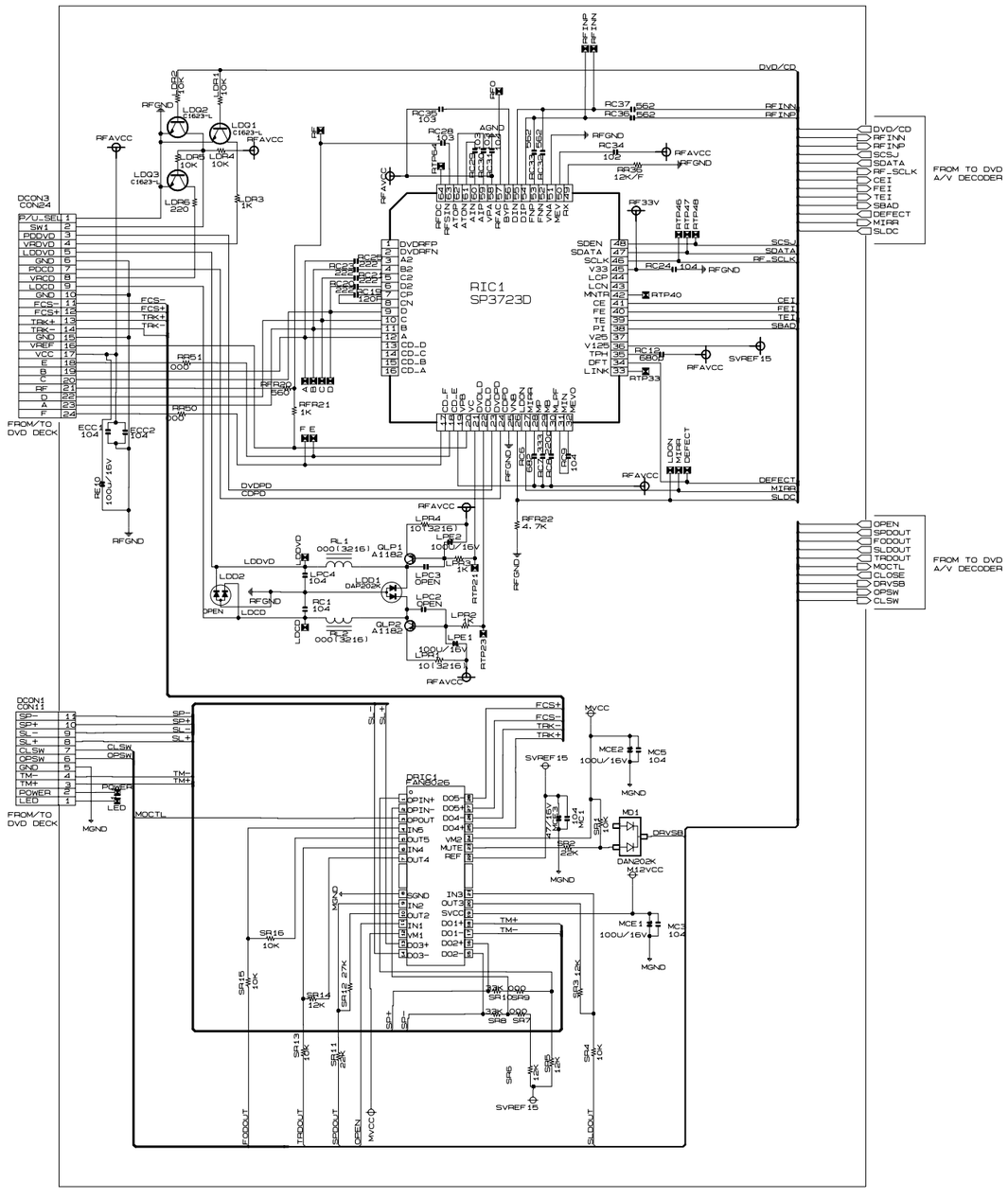
14-11 Input-Output



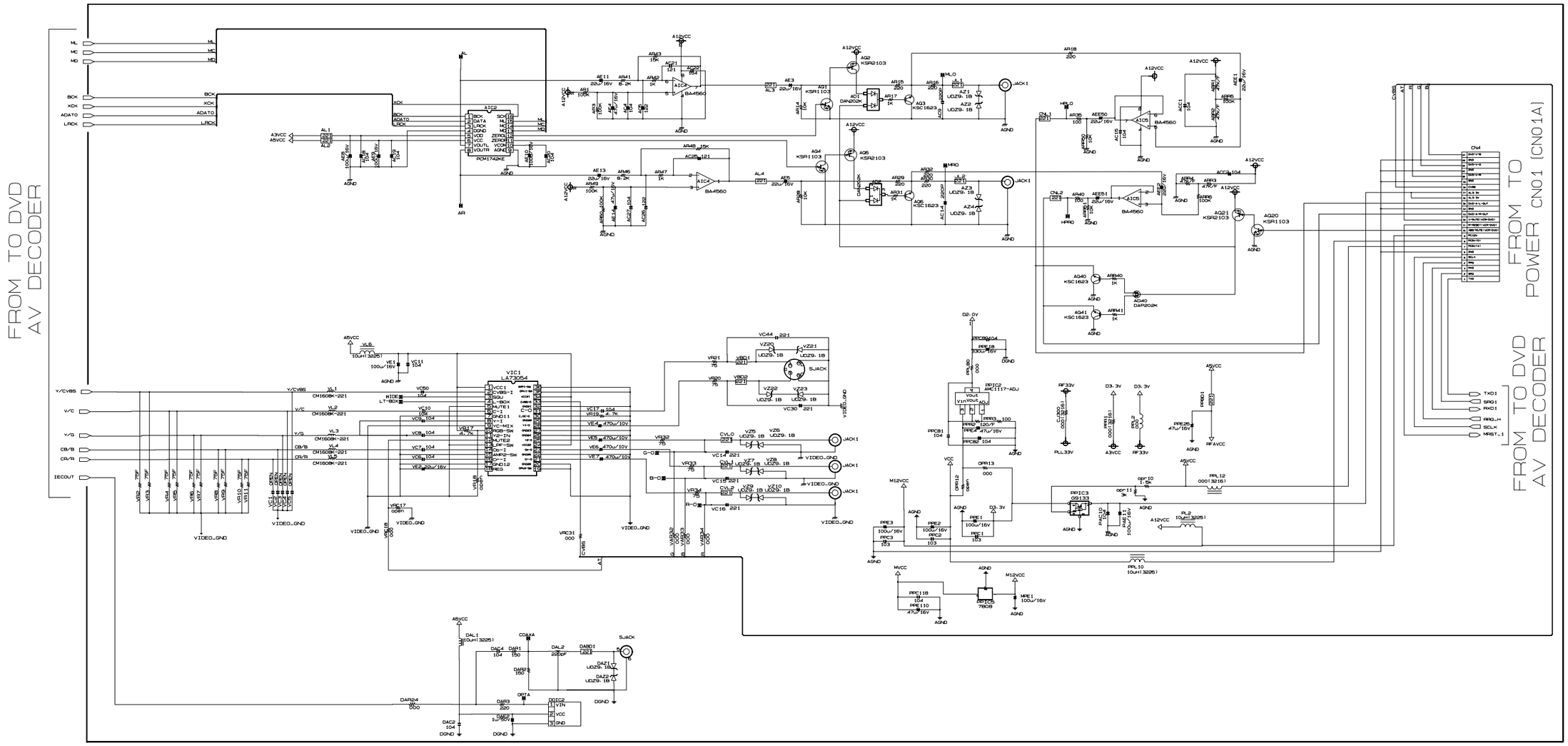
14-12 DVD AV Decorder



14-13 DVD Servo



14-14 DVD Audio/Video



MEMO

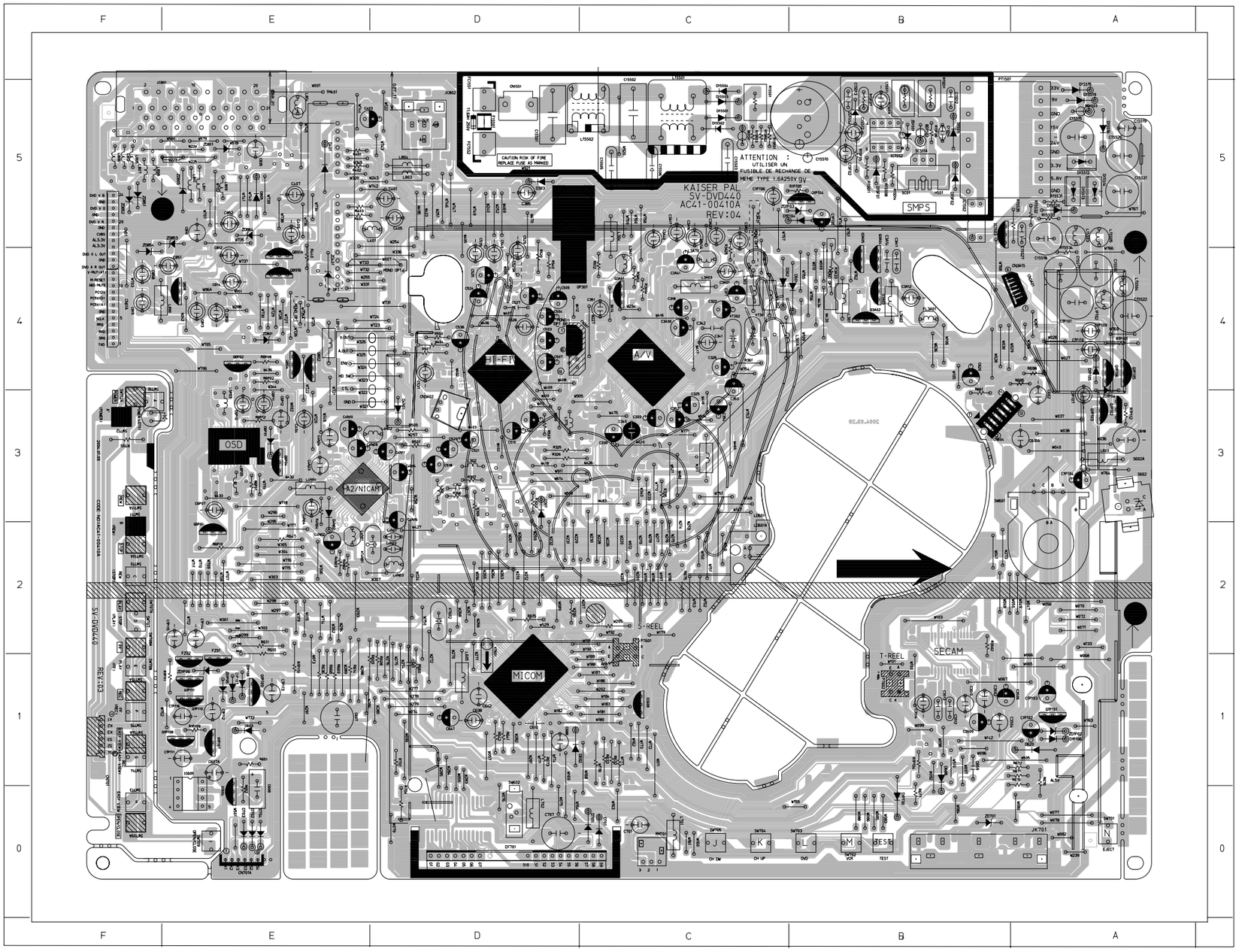
15. PCB Diagrams

15-1 VCR Main PCB ---------- 15-2

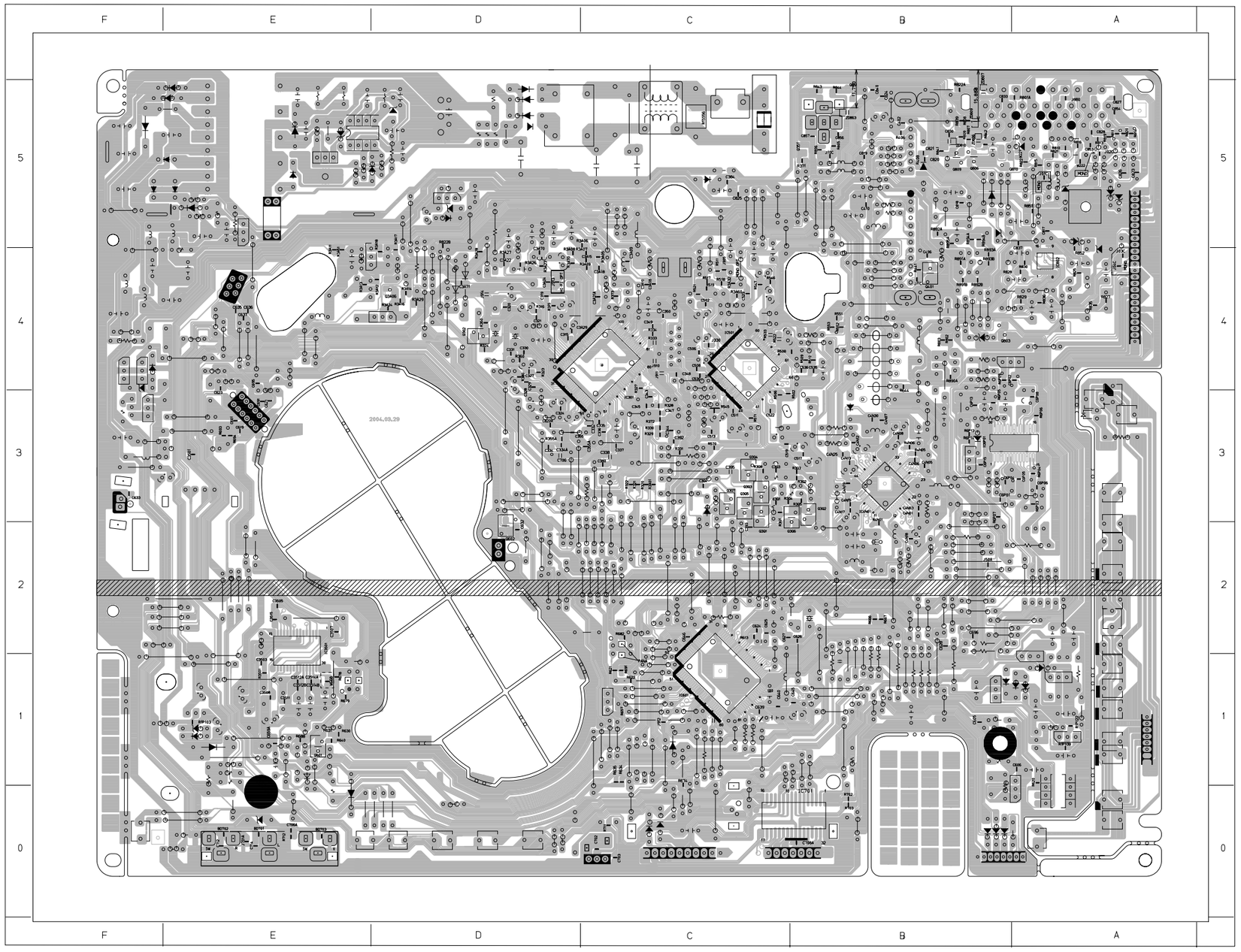
15-2 DVD Main PCB ---------- 15-4

15-1 VCR Main

COMPONENT SIDE

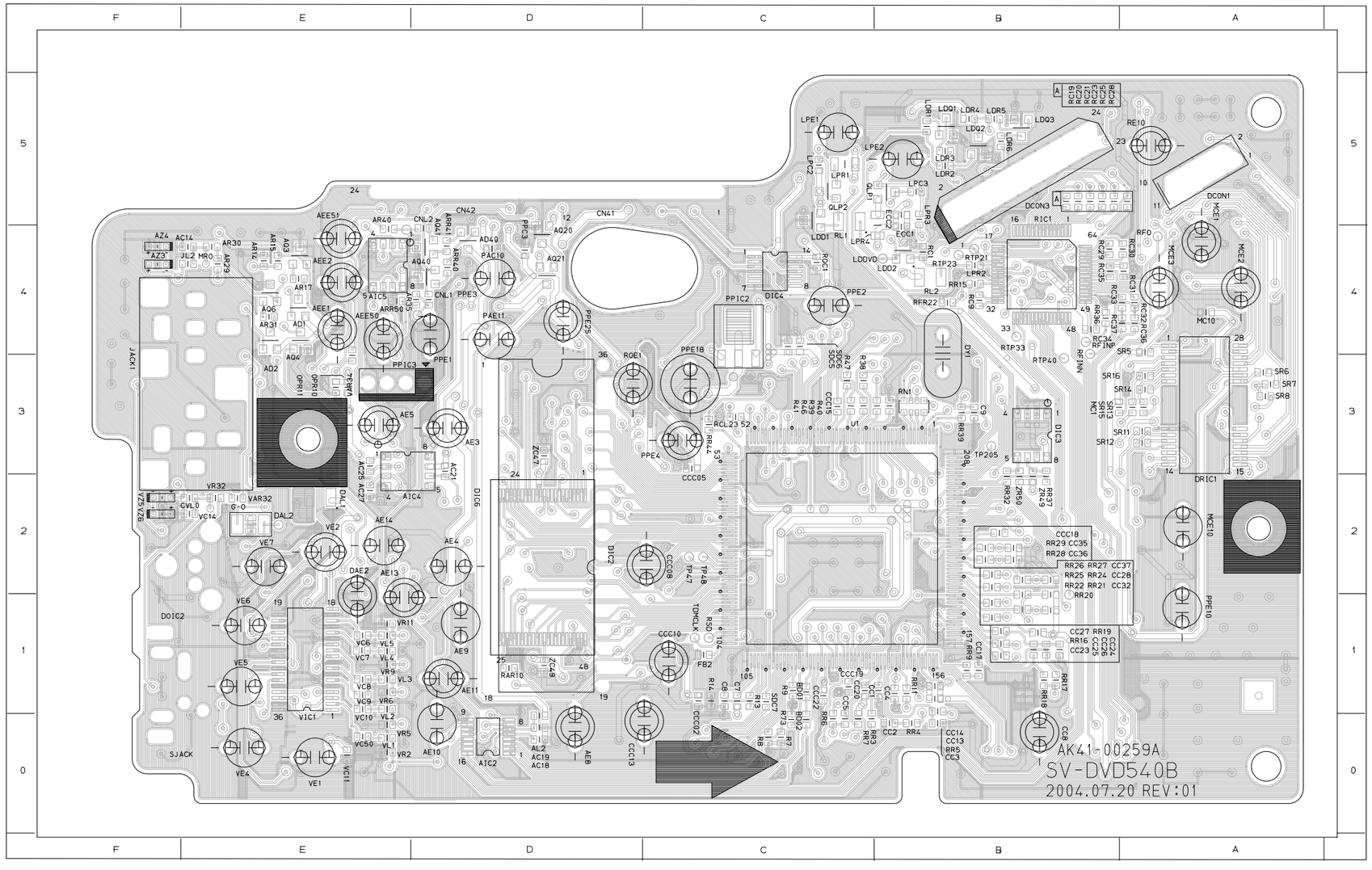


CONDUCTOR SIDE

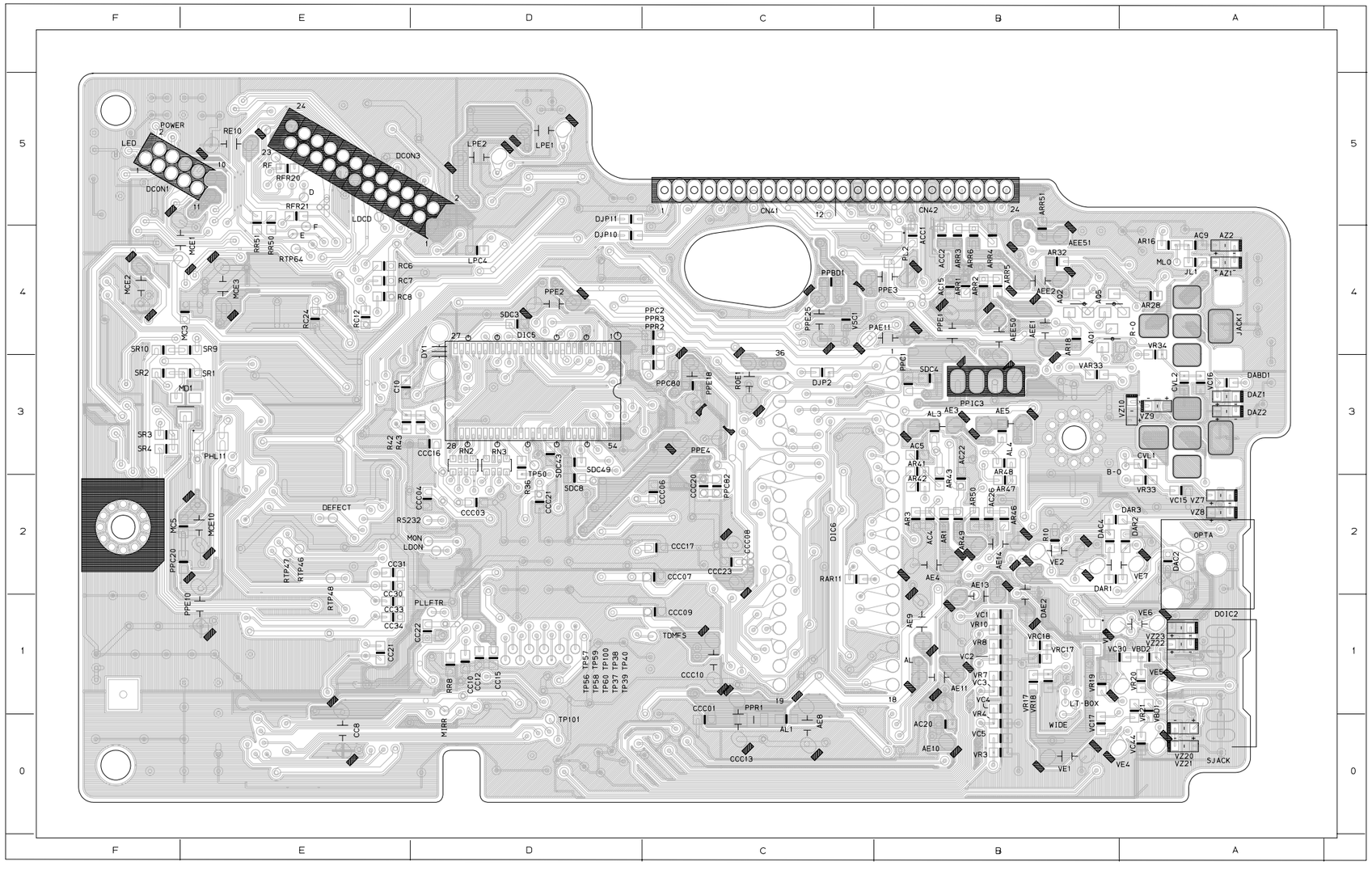


15-2 DVD Main

COMPONENT SIDE



CONDUCTOR SIDE



MEMO

TOSHIBA CORPORATION

1 1, SHIBAURA 1 CHOME, MINATO KU, TOKYO 105 8001, JAPAN